WATER SUPPLY PLAN

FOR THE

SOUTHEASTERN CONNECTICUT REGION

Volume 1 - Inventory

Prepared Jointly by the Staffs of the

SOUTHEASTERN CONNECTICUT WATER AUTHORITY

and the

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY

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WATER SUPPLY PLAN

FOR THE

SOUTHEASTERN CONNECTICUT REGION

VOLUME I, INVENTORY

U.P.A. Project Conn. P-104

This report is part of a comprehensive planning program being carried out in part with an Urban Planning Grant from the Department of Housing and Urban Development, under the provisions of Section 701 of the Housing Act of 1954, as amended, and with financial participation of a state Water and Sewer Facilities Planning Grant from the State of Connecticut administered by the Connecticut Development Commission.

Prepared jointly by the Southeastern Connecticut Water Authority, 257 Main Street, Norwich, Connecticut, and the Southeastern Connecticut Regional Planning Agency, 139 Boswell Avenue, Norwich, Connecticut.

September, 1969

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ERRATA

For Water Supply Plan for the Southeastern Connecticut Region, Volume 1, Inventory, September, 1969.

Underlined items should be inserted.
Bracketed items should be deleted.

page 3 - WATER QUALITY
Some of the unfiltered surface supplies show raw water analyses with occasional high coliform (organisms) counts,

page 4 - line 1
The water supplies of the region contain (452) 507 miles of water mains.

page 32 - bottom of page
There are two wells in the system, but (No. 2) No. 1 is out of service.

page 33 - top of page
No. 2 (Driven) Gravel Packed: 8 in. diameter, 38 ft deep, yield 120 gpm

page 33 - WELL PUMPING
No. 1: 75 gpm (centrifugal) vertical turbine pump equipped with a (7 1/2) 5 hp motor, was removed in 1966.
No. 2: (130 gpm, presently not used.) Vertical turbine with 7 1/2 hp motor.

page 33 - REMARKS
Well Pump #2 (the pump) is installed in a 6 ft diameter concrete pit, at the top of Well #2.

page 33 - STORAGE FACILITIES
(Two pressure tanks, 1,000 gal each.)

page 35 - WATER QUALITY
The State Health Department required adequate removal facilities as a condition of approval of the supply.

page 62 - FIRE PROTECTION
(The National Board of Fire Underwriters found that in the City of Groton, 5 out of 10 locations were deficient in fire flow.) Fire flow deficiencies reported by the National Board of Fire Underwriters in 1963 and 1964 have now been corrected.

page 86 - 6th line
The system was originally constructed in (1956) 1962.

page 86 - SOURCE OF SUPPLY
The source of supply consists of one 24 in. diameter gravel packed well (421) 42 ft deep.

page 121 - WATER QUALITY
Coliform group - (found 3 times out of 50 samples)
Coliforms were not present in the pump station discharge.
Free chlorine residual (0.2) 2.0 mg/l.

page 165
Borough of Colchester (Inv.) Mun.

page 166
Country Estates, Inc. (Hom.) Inv.

page 167
Cedar Ridge Water Association (Inv.) Hom.

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(The National Board of Fire Underwriters found that in the city of Groton, 5 out of 10 locations were deficient in fire flow.) Fire flow deficiencies reported by the National Board of Fire Underwriters in 1963 and 1964 have now been corrected.

40 - 4th line
The system was originally constructed in (1956) 1962.

40 - SOURCE OF SUPPLY
The source of supply consists of one 24 in. diameter gravel packed well (4421) 42 ft deep.

41 - WATER QUALITY
Coliform group - (found 3 times out of 50 samples)
Coliforms were not present in the pump station discharge.
Free chlorine residual (0.2) 2.0 mg/l.

Page 163
Borough of Colchester (Inv.) Mun.

Page 166
Country Estates, Inc. (Hom.) Inv.

Page 167
Cedar Ridge Water Association (Inv.) Hom.

1

SUMMARY

GENERAL

Volume I of the Water Supply Plan contains a detailed inventory of the facilities which provide water service for the residents of each of the eighteen towns in the region. The data, presented without evaluation includes 1960 and estimated 1968 population, a description of each of 74 water utilities which provide service within the region, and the number of people who are dependent upon residential wells. Service to large consumers, industrial, institutional and commercial, is dealt with individually. Operating data and plant descriptions are presented, including the total present water requirements of each town. In the case of New London and Waterford, as well as Groton and Stonington, the requirements are presented jointly, in view of the fact that an important part of the total water supply serves the respective pairs of towns together.

SERVICE

The population of the Southeastern Connecticut region increased from 177,035 in 1960 to an estimated 216,800 in 1968, an average of 1.5% per year. The 52,021 water consumers therefore represent 4.2 persons per water service.

61% of the people were served by public supplies, while 39% depended upon individual wells. For the purposes of this report, only systems with at least 10 services were considered to be public water systems.

PRODUCTION

An average of 26.5 mgd is produced in the region, 22.9 mgd served by utilities and 3.6 mgd by residential wells. The former figure includes industries using potable or high-grade process water supplied by themselves, but does not include low-grade process or cooling water.

Average residential water consumption is approximately 60 gpd/cap. Total water for all purposes considered in this report amounts to 120 gpd/cap.

WATER UTILITIES

Water service was provided by the following classifications of water utility:

Municipally owned utilities serving more than 1,000 people	6
Investor owned utilities serving more than 1,000 people	5
Municipally owned utilities serving less than 1,000 people	1
Investor owned utilities serving less than 1,000 people	31
Homeowner's associations	8
Mobile home courts	13
Industries using more than 1,000 gpd	4
Miscellaneous small supplies	6
Total number of utilities surveyed	74

Total area served represents less than 10% of the total land area of the region.

SOURCES OF SUPPLY

Surface reservoirs supply all or an important part of the water needs of Sprague, Griswold, Groton, New London, Norwich, Stonington and Waterford. Other communities derive their water supply from wells. The total number of wells, including public, institutional and industrial supplies as well as residential wells, is approximately 20,500. In the case of Groton, New London and Norwich, water supplies are derived at least partially from facilities located in other towns. The map on page 7 shows the major sources of water serving this region at present.

TREATMENT

The supplies of the City of Groton and of Mystic, accounting for 39% of the public water furnished in the region, receive treatment by conventional rapid sand filtration. The remaining surface supplies, 38% of the total, receive chlorination only. Well supplies which are chlorinated account for 5%, and unchlorinated well supplies 18% of the total.

WATER QUALITY

Analytical data for the various supplies indicate that there are pronounced water quality problems in the region. Some of the unfiltered surface supplies show raw water analyses with occasional coliform organisms, indicative of possible contamination. It should be noted that this is before chlorination, which is designed to kill all such organisms. A number of supplies, both surface and ground water, contain substantial iron and manganese.

In general, the characteristics of these waters are typical of those generally found in New England. pH is on the acid side, color tends to be high, and surface waters contain fairly high concentrations of organic matter.

TRANSMISSION AND DISTRIBUTION

The water supplies of the region contain 452 miles of water mains. Older mains are almost exclusively cast iron, but asbestos cement has been used increasingly in recent years. Service pipes are generally copper, with galvanized iron and some lead in the older lines and plastic just starting to come into fairly general use in new service lines.

STORAGE FACILITIES

Some supplies, notably Norwich, rely upon impounding reservoir storage to provide distribution system pressure. In other cases, distribution reservoirs are employed. The smaller ground water supplies rely upon pneumatic tanks to maintain distribution system pressure, ordinarily with air compressors required to maintain water pressure in the tanks. In some cases the wells are pumped first to gravity storage tanks and then into the pneumatic tanks, while in other cases well pumps discharge directly to the pneumatic tanks.

There are a total of 20 distribution reservoirs in the region, with a total of 18.4 mil gal storage capacity.

Total capacity of gravity and pneumatic tanks in well supplies amounts to 1.8 mil gal. Total distribution storage of both sorts amounts to 21 hours of consumption at average rates.

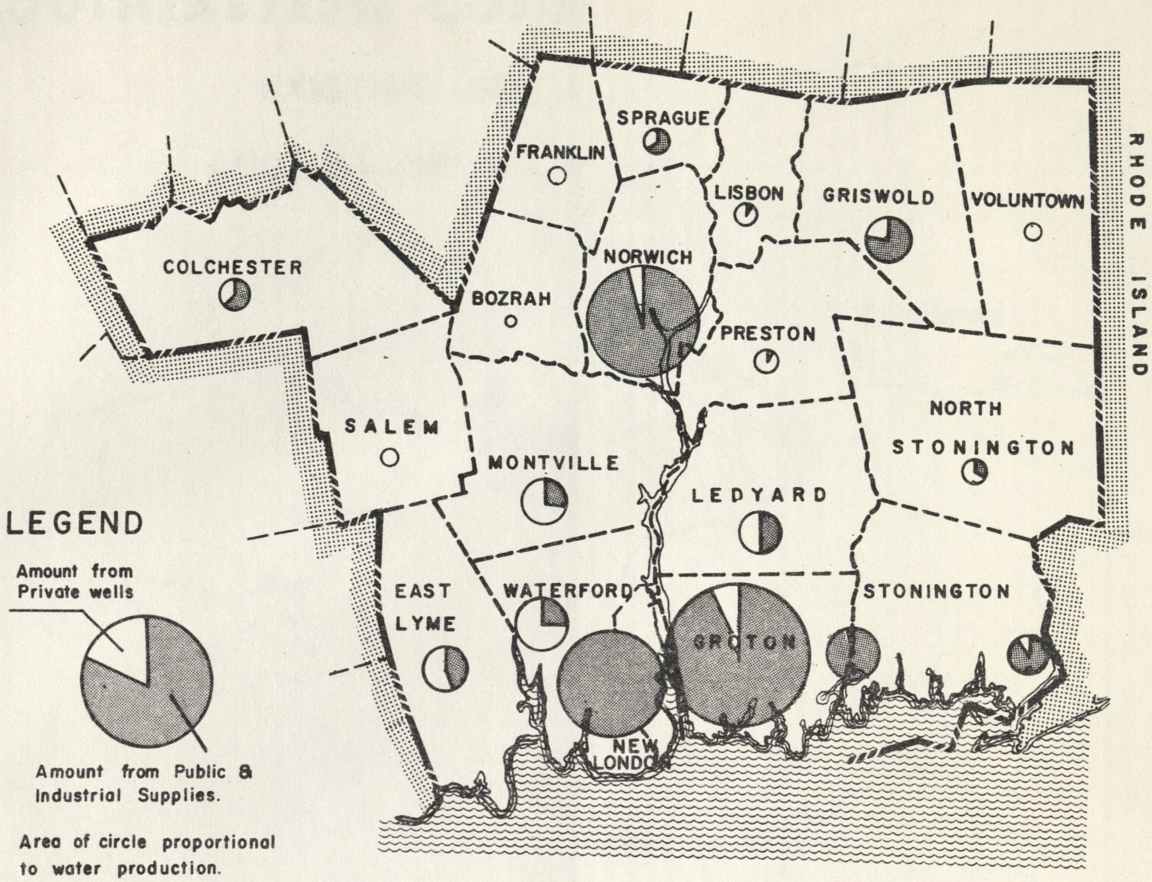
RATES

Rates vary widely, depending upon extent of treatment, type of supply, size of system, and whether publicly owned or investor owned. Rates for the average usage of 60 gpd/cap (250 gal per customer per day) range from $30 to $90 per year. In some cases, homeowners' associations may be said to furnish water service below cost, since the members of the association contribute most of the labor to the system operation and maintenance.

The basis for charges for water service include metered rates, uniform flat rates and fixture rates. In addition, a number of apartments and mobile home courts furnish water service as part of the rental charge.

REFERENCES

This study was based upon the review of various reports and on information gained from personal inspection and from interviews with owners or operators of the respective systems. The reports included State Department of Health data, Public Utility Commission reports, consulting engineering studies and reports of the National Board of Fire Underwriters, in addition to federal, state and local government reports.

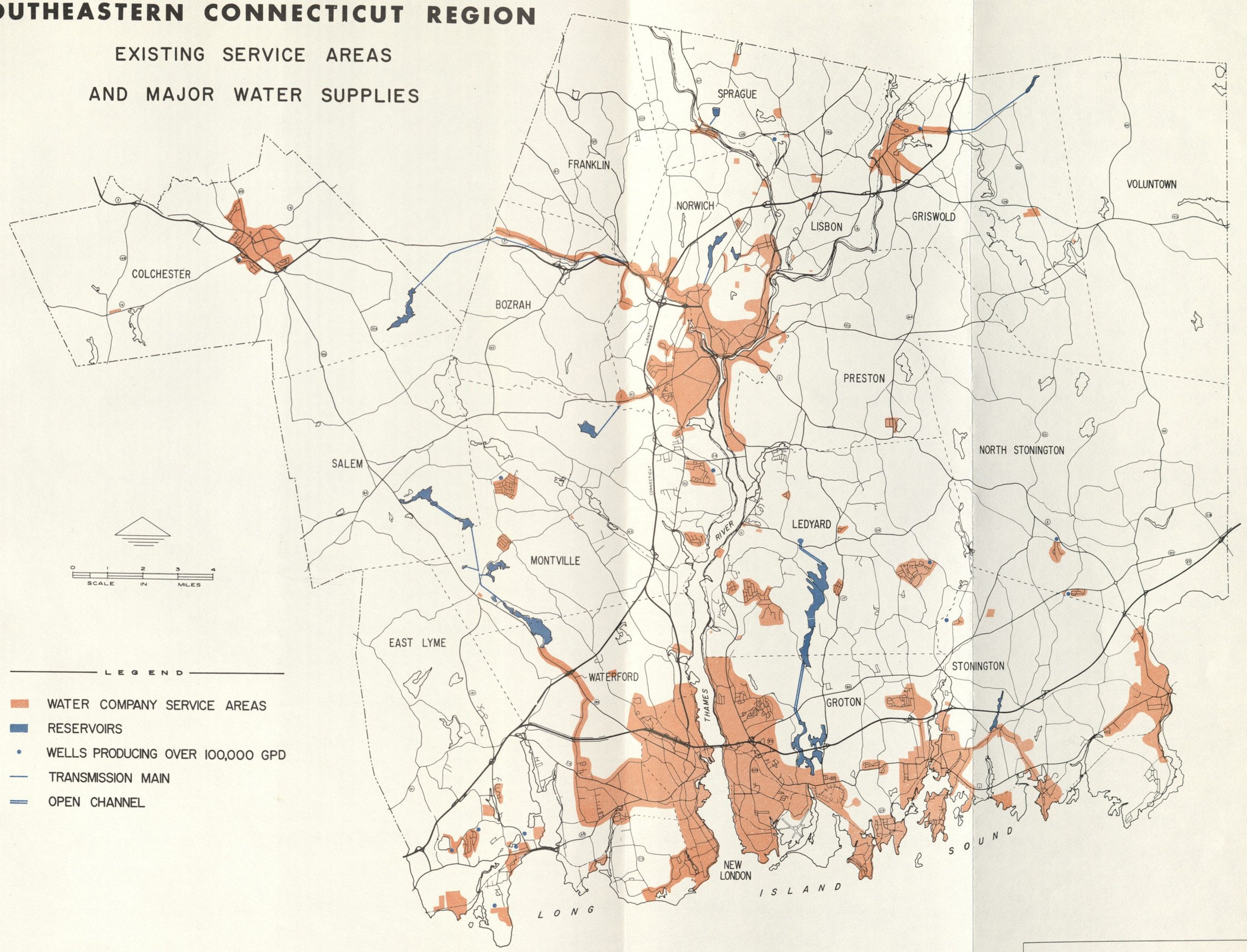


WATER PRODUCTION - SOUTHEASTERN CONNECTICUT.

	POPULATION		WATER SUPPLY				AVERAGE PRODUCTION - mgd		
			RESIDENTIAL WELLS		OTHER				
TOWNS	1960 CENSUS	1968 ESTIMATE	UNITS SERVED	%	CUSTOMERS SERVED	%	UTILITY, INDUSTRIAL, COMMERCIAL	RESIDENTIAL WELLS	TOTAL
Bozrah	1,509	1,900	560	100.0	-	-	-	0.114	0.114
Colchester	4,648	5,800	670	39.1	988	60.9	0.224	0.136	0.360
East Lyme	6,782	9,800	1,900	66.0	941	34.0	0.322	0.400	0.722
Franklin	974	1,200	350	100.0	-	-	-	0.072	0.072
Groton-Stonington	43,906	60,300	3,900	21.8	9,130	78.2	11.007	0.234	11.241
Griswold	6,742	7,200	450	21.5	1,740	78.5	0.792	0.094	0.886
Ledyard	5,395	10,400	1,680	55.0	1,041	45.0	0.345	0.343	0.688
Lisbon	2,019	2,800	720	87.5	140	12.5	0.020	0.150	0.170
Montville	7,759	14,000	3,120	74.6	1,061	25.4	0.254	0.630	0.884
New London	34,182	32,000	-	0	6,737	100.0	4.340	-	4.340
North Stonington	1,982	3,400	670	67.1	302	32.9	0.063	0.136	0.199
Norwich	38,506	42,000	570	4.6	8,636	95.4	5.020	0.120	5.140
Preston	2,778	3,000	820	93.3	58	6.7	0.012	0.168	0.180
Salem	925	1,300	380	100.0	-	-	-	0.078	0.078
Sprague	2,509	2,700	280	35.0	384	65.0	0.169	0.057	0.226
Stonington-Groton covered above									
Voluntown	1,028	1,300	380	100.0	-	-	-	0.078	0.078
Waterford	15,391	17,700	3,960	76.1	1,058	23.9	0.326	0.808	1.134
TOTAL	177,035	216,800	20,410	39.0	31,616	61.0	22.894	3.618	26.512

SOUTHEASTERN CONNECTICUT REGION

EXISTING SERVICE AREAS AND MAJOR WATER SUPPLIES



SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

2

INTRODUCTION, GLOSSARY OF TERMS, AND ABBREVIATIONS

INTRODUCTION

Special Act 381 of the 1967 Connecticut General Assembly, establishing the Southeastern Connecticut Water Authority, states that the Authority "...shall plan, operate and maintain a water supply system and, where necessary, construct water supply systems for the Southeastern Connecticut Planning Region." This report is the first step in dealing with the planning aspects of this mandate.

The initial phase of the planning process is a study of present facilities, the results of which are presented in this report as Volume I of a two-volume study. Volume I discloses, on a town-by-town basis, how the Region's present water requirements are being met. It provides a description of the approximately seventy individual water systems currently serving the Region, together with engineering and operating data and an estimate of the population served by each system. It also indicates the number of people who are supplied by individual wells throughout the eighteen towns of Southeastern Connecticut.

Volume II will analyze the data of Volume I, determine the approximate water needs for each of the next five decades, and present a general plan under which those needs can be met.

The water supply planning program for Southeastern Connecticut is being conducted jointly by the Southeastern Connecticut Water Authority and the Southeastern Connecticut Regional Planning Agency. This arrangement assures maximum coordination between the two agencies and minimizes the cost of the planning program.

The completion of this report would not have been possible without the cooperation of the owners and operators of the many water supply systems in the Region. The assistance of these individuals is gratefully acknowledged. The Authority and the Planning Agency look forward to continued cooperation with these utilities in the development of future water supply systems.

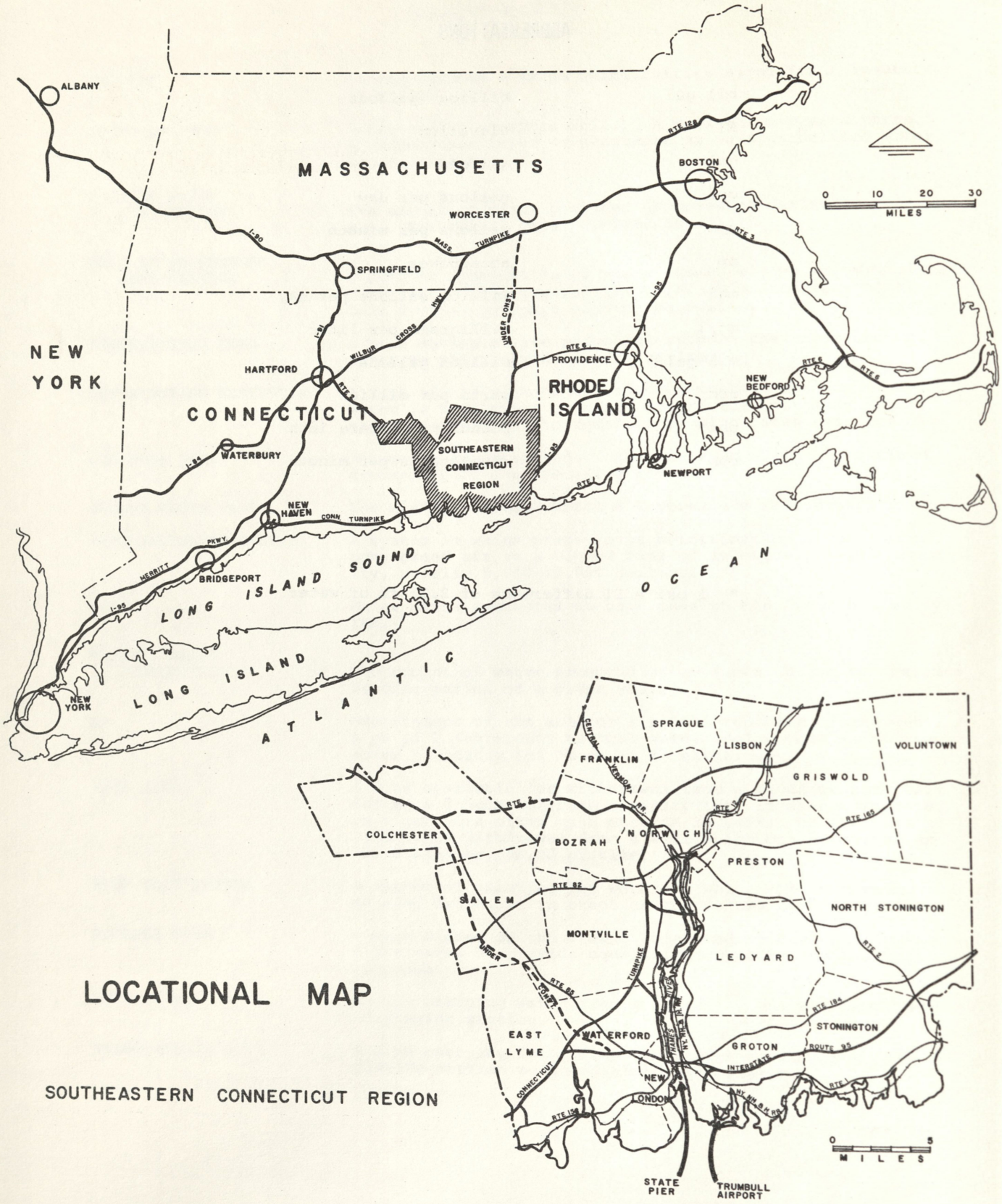
GLOSSARY OF TERMS

AQUIFER	An underground stratum which carries significant quantities of water.
ARTESIAN WELL	(Also called pressure well.) A well which passes through an impervious layer to penetrate an aquifer holding water under pressure.
AVERAGE DAILY CONSUMPTION	The amount of water produced or consumed during an average day. The annual total divided by 365.
BOOSTER STATION OR LIFT STATION	A pump or combination of pumps placed within the system to raise water from one service level to another or to maintain desired pressure within the system.
DISTRIBUTION MAIN	A pipe having as its principal purpose the conveyance of water to the individual service lines.
DISTRIBUTION RESERVOIR	A tank either on high ground or elevated used to store water in sufficient quantity to provide emergency supply under pressure and to equalize pumping rates over the day.
DRAINAGE AREA	(Also called watershed.) An area from which all surface drainage passes a specified point.
GROUND WATER TABLE	The surface beneath which all pores are filled with water.
HYDROPNEUMATIC SYSTEM	A system in which pressure is maintained by a cushion of compressed air in a closed tank of relatively small capacity, usually 5,000-10,000 gallons.
LOOPS	Water mains connected at both ends to the distribution system.
MAXIMUM DAILY CONSUMPTION	The amount of water produced or consumed during the maximum 24-hour period of a given year.
pH	Measurement of the acid or alkaline reaction of the water. A pH of 7 represents neutral water; below this value the water is acidic and above it is alkaline.
SAFE YIELD	A flow available for withdrawal from a river or reservoir during a drought of such severity that it is not expected to occur more often than once in 20 years, or the rate of continuous withdrawal from a well which can be sustained for a similar period of time.
STEP RATE SYSTEM	A method of charging for water in which the unit rate charged decreases in steps as the volume used increases.
STORAGE TANK	A tank either on the ground, elevated or buried, used to store water to provide equalizing capacity for consumption purposes.
SUPPLY MAIN	A pipe carrying water from a source to a treatment plant or pumping station.
TRANSMISSION MAIN	A pipe carrying water from the source of supply or the pumping station to the distribution system.

ABBREVIATIONS

bil gal	billion gallons
El	elevation
gal	gallon
gpd	gallons per day
gpm	gallons per minute
hp	horsepower
mgd	million gallons per day
mg/l	milligrams per liter
mil gal	million gallons
ppm	parts per million
psi*	pounds per square inch
rpm	revolutions per minute

* 1 psi = El difference of 2.31 ft of water



LOCATIONAL MAP

SOUTHEASTERN CONNECTICUT REGION

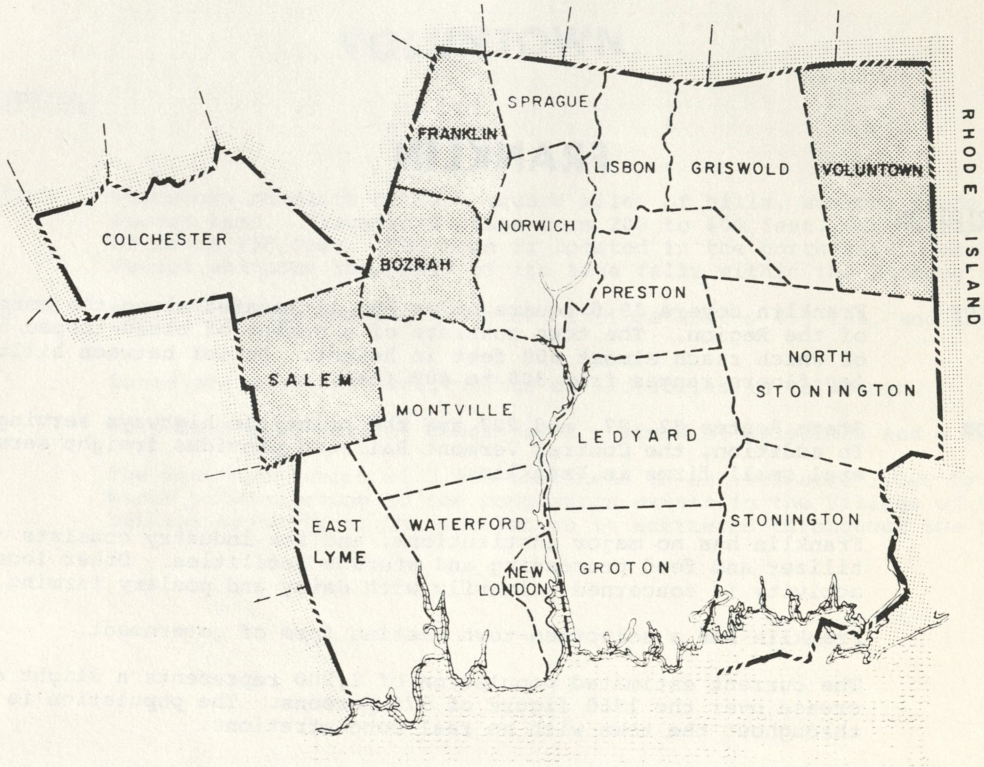
PREPARED BY THE SCRPA STAFF - 1967

PLATE NO. I

3

MUNICIPAL INVENTORY

BOZRAH
FRANKLIN
SALEM
VOLUNTOWN



BOZRAH

GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Bozrah is an extremely hilly town, with limited areas of level land along the Yantic River, Gardner Brook, and adjacent to Gardner Lake in the southwest corner of the town. The town covers 20.1 square miles and is located just west of Norwich in the northern part of the Region. Elevations range from about 150 feet in the stream valleys to over 500 feet on several of the hilltops.

TRANSPORTATION

Limited bus service is available and a short spur line of the Central Vermont Railroad serves the town. The principal highway serving Bozrah is Route 2, a part of the Region's expressway system. Other state highways passing through the town are Routes 82 and 163.

INSTITUTIONS AND INDUSTRY

There are no major institutions in Bozrah. The town's only major industry manufactures plastic products and a former textile mill is currently being used for the raising of thousands of chickens.

GOVERNMENT

Bozrah's form of government involves a board of selectmen, town meeting, and board of finance.

POPULATION

The residents of Bozrah are scattered throughout the municipality, with minor concentrations in Gilman and Fitchville. The 1960 population was 1,590 and is presently estimated to be 2000.

FRANKLIN

GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Franklin covers 19.6 square miles and is located along the northern border of the Region. The town consists of a number of broad-topped hills, several of which reach almost 600 feet in height. Relief between hilltops and valley floors ranges from 300 to 400 feet.

TRANSPORTATION

State Routes 32, 87, and 207 are the principle highways serving Franklin. In addition, the Central Vermont Railroad provides freight service to several small firms in Franklin.

INSTITUTIONS AND INDUSTRY

Franklin has no major institutions, and its industry consists of small fertilizer and feed processing and storage facilities. Other local economic activity is concerned primarily with dairy and poultry farming.

GOVERNMENT

Franklin has a selectmen-town meeting form of government.

POPULATION

The current estimated population of 1,200 represents a slight numerical increase over the 1960 figure of 974 persons. The population is scattered throughout the town with no real concentrations.

SALEM

GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS	Salem is located along the western border of the Region and comprises 29.4 square miles of forest-covered hills and open fields. The more gently sloping land is found near the center of the town and in its northeast quarter adjacent to Gardner Lake. Elevations range from 200 to 600 feet, with an average relief of about 200 feet between hilltops and valley floors.
TRANSPORTATION	State highways serving Salem are Routes 82, 85, and 354. The Route 85 Expressway, expected to be constructed in the near future, will pass through the center of Salem and interchange with local roads at two locations within the town.
INSTITUTIONS AND INDUSTRY	There are no major institutions or industries in Salem.
GOVERNMENT	Salem's form of government involves a board of selectmen, town meeting, and board of finance.
POPULATION	The population of Salem is scattered throughout the town with no significant concentrations. The present estimated population is 1,300 as compared with 925 persons in 1960.

VOLUNTOWN

GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS	Voluntown consists of 40.1 square miles of hills, swamps, ponds, and forest land. Elevations range from 200 to 600 feet, with a maximum relief of about 250 feet. The town is located in the northeastern corner of the Region and more than half of its area falls within the Pachaug State Forest.
TRANSPORTATION	State highways serving Voluntown include Routes 49, 138, and 165.
INSTITUTIONS AND INDUSTRY	There are no major institutions or industries in Voluntown.
GOVERNMENT	Voluntown's government consists of a board of selectmen and a town meeting.
POPULATION	The 1960 population of 1,028 increased to an estimated 1,300 by 1969. A minor concentration of the population exists in the Village of Voluntown, but the majority of the population is scattered throughout the town.

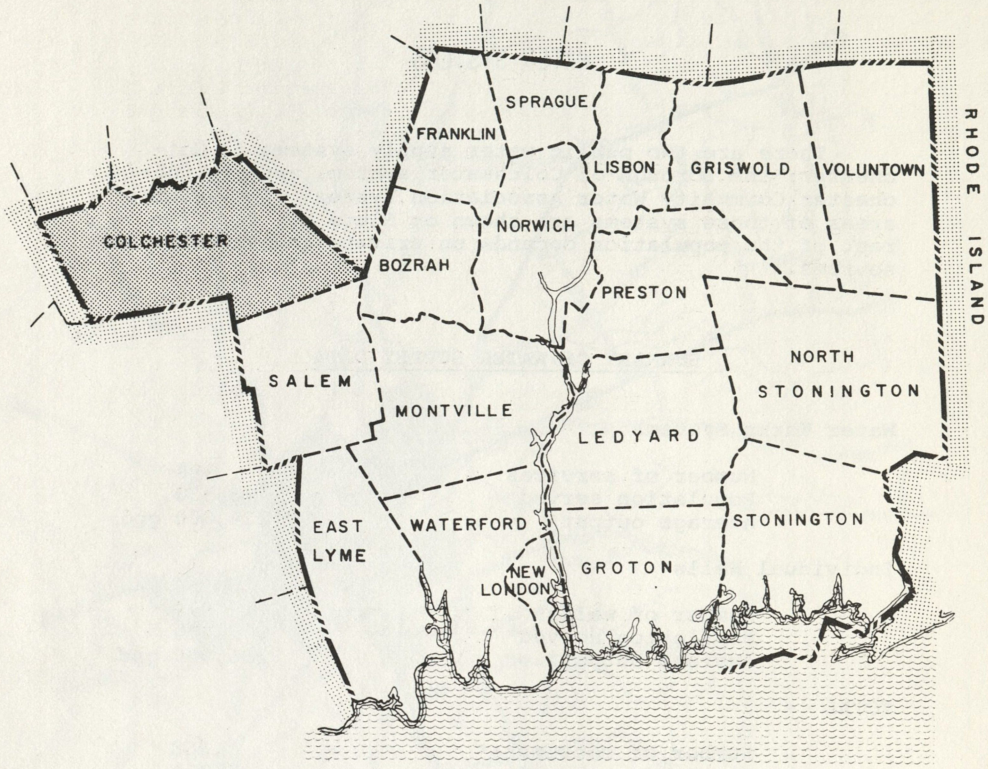
WATER SYSTEMS

Bozrah, Franklin, Salem, and Voluntown are rural communities, having population densities of less than 100 persons per square mile. There are no public water supply systems in Franklin, Salem, and Voluntown. Some residents of Bozrah living directly along the transmission main of the City of Norwich water supply are served by that system, as are a few in the area adjacent to the Salem Turnpike.

SUMMARY OF WATER SUPPLY DATA

	Estimated Population 1968	Estimated Number of Wells	Estimated Average Daily Consumption
Bozrah	1,900	560	114,000 gal
Franklin	1,200	350	72,000 gal
Salem	1,300	380	78,000 gal
Voluntown	1,300	380	78,000 gal

COLCHESTER



GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Colchester occupies a peninsular position in the northwest corner of the Region. It comprises 48.5 square miles and has a broad variety of topographic features, including numerous streams, ponds, wetlands, hills, and broad plateaus. Elevations range from less than 100 feet along the Salmon River in the western part of town to more than 600 feet in the plateaus area which prevails in the eastern and southern parts of the town.

TRANSPORTATION

Passenger service is limited to buses, while freight is handled by various trucking concerns. Colchester is an important crossing point of several state highways, including Routes 2, 85, 16, and 149.

INSTITUTIONS AND INDUSTRY

There are no major institutions in Colchester. A number of small industries produce leather goods, clothing, and plastic goods. The numerous small commercial establishments in the center of the town serve Colchester and several of the surrounding rural communities.

GOVERNMENT

Colchester has a selectmen-town meeting-board of finance form of government. The two-square-mile Borough of Colchester, located in the center of the town, is governed by a Warden and Burgesses.

POPULATION

The 1960 population of 4,648 has grown to an estimated 5,900 persons, about half of which are concentrated in the Borough. The remainder are scattered throughout the town.

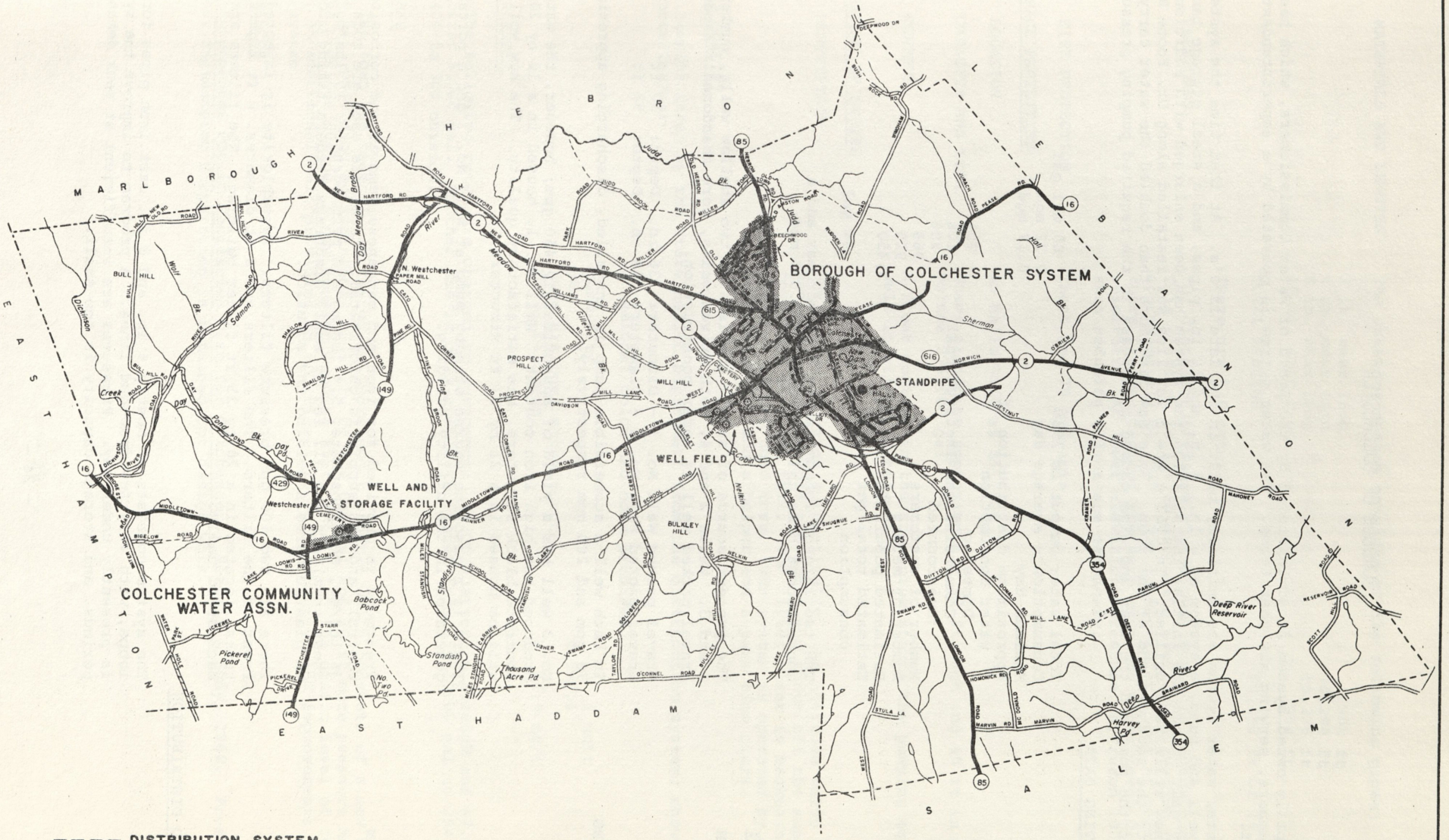
WATER SYSTEMS

There are two public water supply systems in Colchester; the Borough of Colchester system, and the Colchester Community Water Association system. The service areas of these systems are shown on Plate No. 2. The rest of the population depends on private individual sources.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	988
Population served	3,530
Average output	224,000 gpd
Individual Wells	
Number of wells*	670
Population served*	2,270
Average output*	136,000 gpd
TOTAL	
Number of consumers*	1,658
Population served*	5,800
Average output*	360,000 gpd

* Estimated


MARLBOROUGH
HEBRON
EAST HAMPTON
EAST HADDAM
LEBANON
MARLBOROUGH
BOROUGH OF COLCHESTER SYSTEM
STANDPIPE
WELL FIELD
WELL AND STORAGE FACILITY
COLCHESTER COMMUNITY WATER ASSN.
N. Westchester
Westchester
PROSPECT HILL
MILL HILL
BULL HILL
BULKLEY HILL
Babcock Pond
Pickerel Pond
Standish Pond
Thousand Acre Pd
No Two Pd
Deep River Reservoir
Harvey Pd
Day Pond
Salmon Brook
Jeremy River
Judd Brook
Sherman Brook
Day Meadow Brook
Dickinson Creek
Pine Brook
Hutchins Brook
Hell Bk
Giffe Bk
Hayward Bk
Deep River
Rivers
Sherman
Judd
Hell
Hutchins
Hayward
Giffe
Day
Salmon
Dickinson
Pine
Judd
Sherman
Hutchins
Hayward
Giffe
Day
Salmon
Dickinson
Pine
Judd
Sherman
Hell

BOROUGH OF COLCHESTER

GENERAL

The municipally owned system is administered by the Board of Water Commissioners, which has three elected members, serving six year terms. The water system is operated by a superintendent and an assistant.

The Colchester water system was initially built in the late 1930's. At that time the system consisted of a well and pump, a system of 6 in., 8 in. and 10 in. pipes, and a steel storage tank of about 375,000 gal. Since the initial installation the system has been enlarged with additional pipes, and two new wells were drilled. In 1963 a new 6 in. line was installed along Dr. Foote Road from the pumps to the southern end of the town. This new line more than doubled the water carrying capacity between the pump and the town and also caused a decrease in the required pumping pressure.

PLANT AND OPERATING DATA

Total water output in 1968	80 mil gal
Consumption - average day	0.22 mgd
Maximum day	0.37 mgd
Approximate distribution of water consumption	
Domestic	70%
Commercial and Institutional	10%
Unaccounted	20%
Number of customers	968
Number of meters	920
Estimated population served	3,450
Estimated total per capita consumption	64 gal

The two largest consumers are a laundromat and a convalescent home using a total of 0.020 mgd.

SOURCE OF SUPPLY

DESCRIPTION

The present source of supply consists of two shallow wells, numbered 1 and 3. Wells 2 and 4, both driven wells, were abandoned. A new gravel packed well is under construction.

Gravel packed Well No. 1 - Diameter: 36 in. Depth: 30 ft
Gravel packed Well No. 3 - Diameter: 48 in. Depth: 58 ft

WELL PUMPING

In each well a submersible pump is installed, discharging approximately 70 gpm and 200 gpm respectively.

REMARKS

No. 3 well has a yield of approximately 450 gpm; however, the water produced has high iron content. Well No. 1, housed in a 10 by 20 ft concrete block structure, has satisfactory quality. The new well will be housed in a 21 by 27 ft structure.

EMERGENCY

There is a gasoline engine standby pump at Well No. 3 and a portable generator in the utility building.

TREATMENT

DESCRIPTION

Treatment is provided for iron and manganese removal and corrosion control, and the supply is chlorinated. Chemicals used are soda ash, 36 lbs/mg, metaphosphate, 5.4 lbs/mg and permanganate, 15 lbs/mg. These chemicals are all fed by small diaphragm feeders taking suction on plastic barrels holding the solution.

There are two 100 gpm pressure filters. Hypochlorite is injected in front of the filters. The filters are 6 ft diameter, 6 ft high steel tanks, located in a 20 by 25 ft filter building. The filters are backwashed daily.

TRANSMISSION AND DISTRIBUTION

GENERAL

The system consists of mostly 6 in. and 8 in. cast iron pipes forming loops, with very few dead-end lines. A program to improve the system is presently under way. Pressures are insufficient at peak demand periods, and storage capacity is too small.

MATERIALS AND LENGTHS — The existing system consists of the following pipes:

3 in. cast iron	908 ft
6 in. cast iron	70,294 ft
8 in. cast iron	16,226 ft
10 in. cast iron	954 ft
TOTAL LENGTHS	88,382 ft or 16.7 miles

There are 920 meters.

PRESSURES — The discharge pressure at the pump house is approximately 130-140 psi. This pressure is set to match the overflow elevation of the standpipe, approximately El 570. Due to high elevations at certain locations, there is insufficient pressure when the water level drops in the reservoir. At lower elevations pressure may reach 100 psi, and pressure reducing valves are necessary.

FIRE PROTECTION — There are 79 hydrants.

STORAGE FACILITIES

LOCATION — On Halls Hill at El 530.

CAPACITY AND TYPE — Steel standpipe approximately 40 ft high and 40 ft in diameter, volume 375,000 gal.

CONTROL — A float control in the standpipe starts the pumping equipment at the well locations by telemetry.

OPERATION OF SYSTEM

DESCRIPTION — The system operates automatically. An altitude valve at the foot of the reservoir controls the pumps and shuts off the supply to the reservoir if it is full. The filter plant is backwashed daily regardless of the head loss. The system is operated by a full time superintendent and a helper and a part time clerk.

WATER QUALITY

Samples taken by the State Health Department from the distribution system, showed the following characteristics:

Occasional color and odor problems.

Turbidity	1 unit
pH	6.9-7.1
Some nitrogen constituents	
Total hardness	44.0 mg/l

WATER RATES

The following rates are charged to customers: $6.00/quarter in Borough and $7.00 outside for the first 8,000 gal. Further use is on a step rate system from 35¢/1,000 gal to 25¢ in the Borough and 40¢ to 30¢ outside.

REMARKS

The town has recently initiated an improvement program which consists of a new standpipe on Halls Hill providing an additional capacity of 600,000 gal and 20 ft more pressure head compared to the previous system; a new booster pumping station to match the static level of the new reservoir; an additional well providing an additional 200 gpm capacity; and improvements in the distribution system.

REFERENCES

Recommended Public Facilities Plan for Colchester. Metcalf & Eddy, 1968. Presently Henry Souther Engineering Corporation is retained for design work.

COLCHESTER COMMUNITY WATER ASSOCIATION

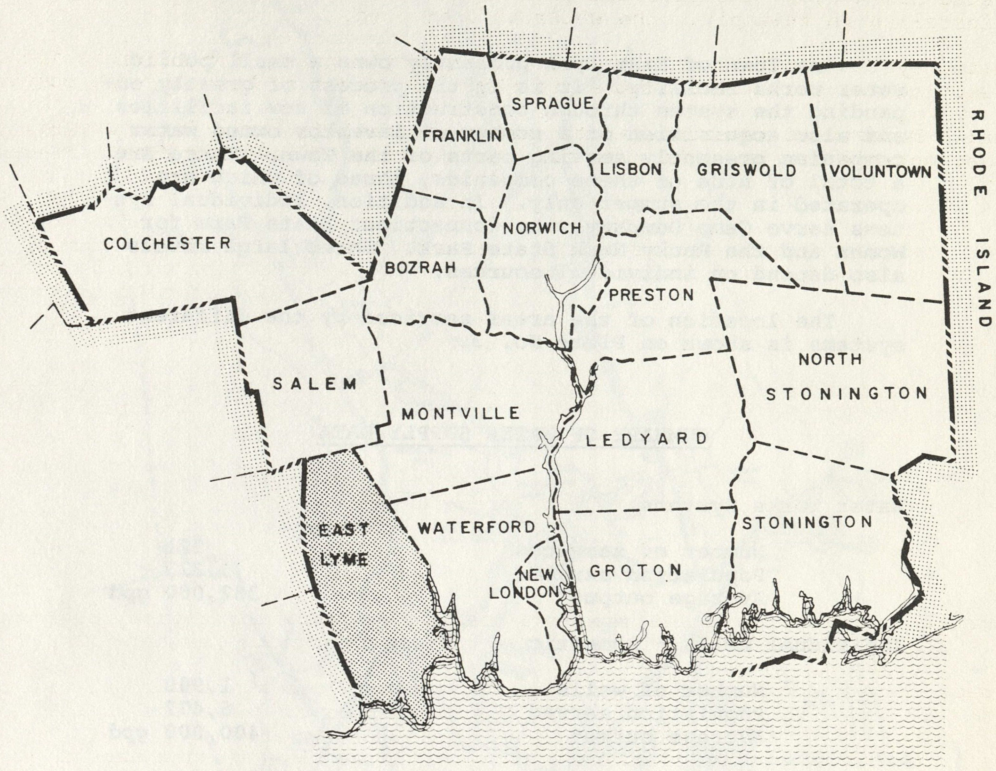
This homeowners' association is located in the Village of Westchester on the north side of Route 16. There are 20 services connected to this system. The estimated population is 80, with average daily water consumption estimated at 4,000 gal.

The source of supply is a single drilled well, 10 in. in diameter and 56 ft deep. The well yield is 50 gpm, and the capacity of the submersible pump is 20 gpm. The pump is located in a concrete pit, which also has a 5,000 gal pressure tank bulkheaded into it. A sump pump and air compressor are also installed in this pit. The water is untreated.

The distribution system consists of a single 4 in. plastic main. The services are 1 in. plastic lines, each line serving two customers. There are shut-off valves at each service connection.

The State Health Department reports that the water was safe for drinking; however, the iron content was above acceptable limits. The rate for the service is $5.00 per month.

EAST LYME



GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

East Lyme is the most westerly of the Region's coastal towns. It contains 35.7 square miles and has generally level, buildable land in the southern part of the town and rough topography in the northern part. Elevations range from sea level to 500 feet while maximum relief reaches about 300 feet.

TRANSPORTATION

Freight service is provided by rail and truck while passenger service is limited to buses. East Lyme has excellent access to the Connecticut Turnpike and is also served by State Routes 51, 156, and 161.

INSTITUTIONS AND INDUSTRY

The State Farm for Women is East Lyme's only major institution. Industry is negligible and economic activity centers on the recreational boating businesses. A small commercial center is located in Niantic.

GOVERNMENT

East Lyme has a selectmen-town meeting-board of finance form of government.

POPULATION

Most of the residents of East Lyme live in the southern half of the town which contains numerous scattered subdivisions as well as the village of Niantic. The population swells in the summer months and seasonal settlements are found along the Niantic River and at Black Point and Giants Neck. The current estimated year-round population is 10,400, an impressive increase since 1960 when the population was 6,782.

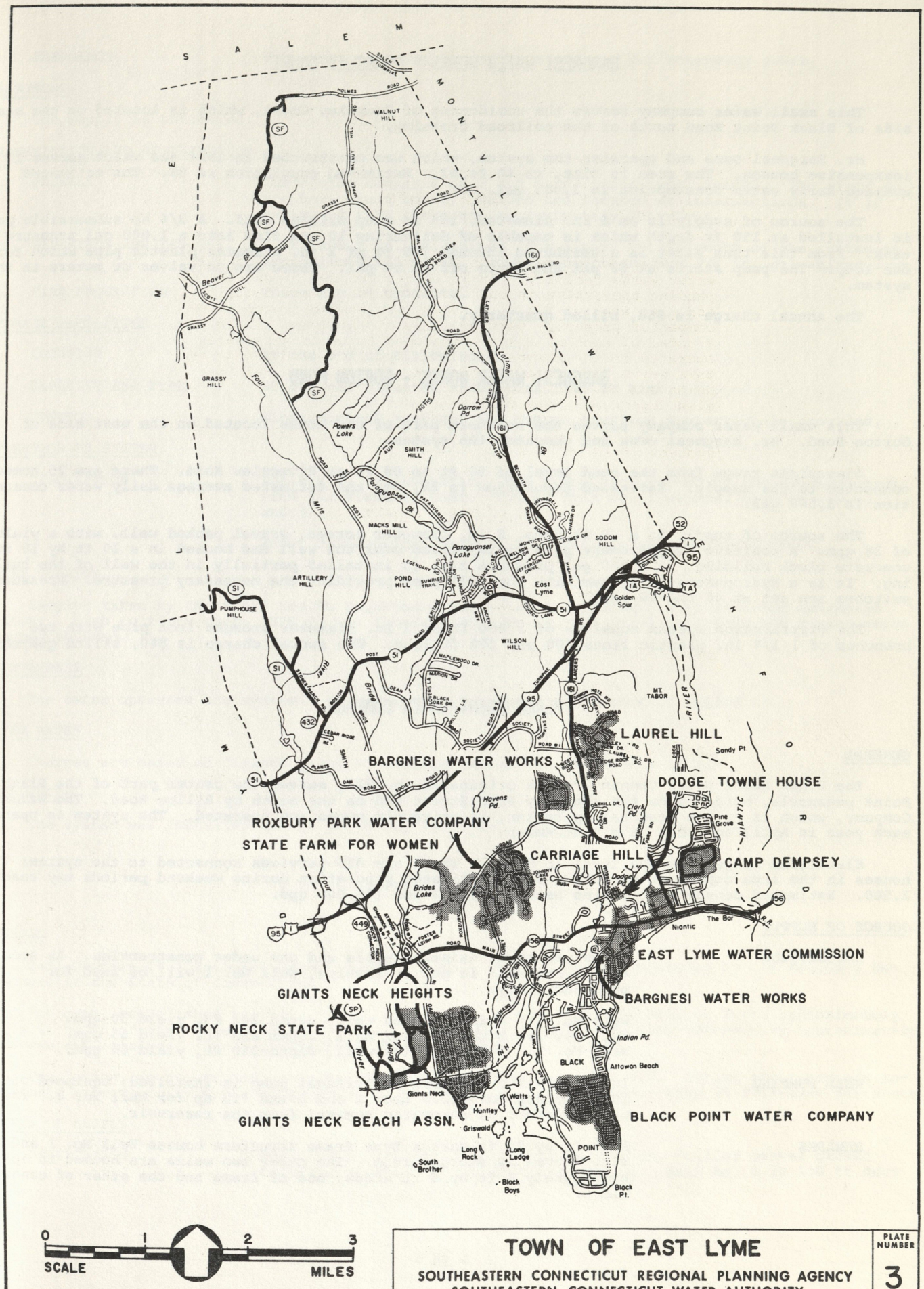
WATER SYSTEMS

The Town of East Lyme presently owns a small public water works facility. It is in the process of greatly expanding the system through construction of new facilities and also acquisition of a number of investor owned water companies presently serving parts of the Town. There are a total of nine of these companies, three of which are operated in the summer only. In addition, individual systems serve Camp Dempsey, the Connecticut State Farm for Women and the Rocky Neck State Park. Three large motels also depend on individual sources.

The location of the areas serviced by the different systems is shown on Plate No. 3.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	921
Population served	3,323
Average output	332,000 gpd
Individual Wells - Domestic	
Number of wells	1,900
Population served	6,477
Average output	400,000 gpd
Individual Wells - Commercial and Institutional	
Number of wells	23
Average output	80,000 gpd
TOTAL	
Number of consumers	2,844
Population served	9,800
Average output	812,000 gpd



TOWN OF EAST LYME

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 3

BARGNESI WATER WORKS - CROSSLEY COURT

This small water company serves the residences of Crossley Court, which is located on the eas side of Black Point Road north of the railroad crossing.

Mr. Bargnesi owns and operates the system, which was constructed in 1954 and which serves 17 inexpensive houses. The area is flat, at 40 ft El. Estimated population is 60. The estimated average daily water consumption is 3,000 gal.

The source of supply is an 8 in. diameter, 186 ft deep drilled well. A 3/4 hp submersible pu is installed at 150 ft depth which is capable of delivering 10 gpm flow into a 1,000 gal pressure tank. From this tank water is distributed through 700 ft of 2 in. diameter plastic pipe which for one loop. The pump starts at 30 psi and shuts off at 50 psi. There are no valves or meters in the system.

The annual charge is $60, billed quarterly.

BARGNESI WATER WORKS - GORTON POND

This small water company serves the northern part of the homes located on the west side of Gorton Pond. Mr. Bargnesi owns and operates the system.

Elevations range from the pond level of 30 ft to 90 ft at Riverview Road. There are 25 homes connected to the supply. Estimated population is 85, and the estimated average daily water consump tion is 5,000 gal.

The source of supply is a 48 ft deep, 8 in. diameter screen, gravel packed well, with a yield of 38 gpm. A positive displacement pump is installed over the well and housed in a 10 ft by 10 ft concrete block building. A 1,000 gal pressure tank is installed partially in the wall of the building. It is a hydropneumatic system with the well pump providing the necessary pressure. Pressure switches are set at 40 and 60 psi.

The distribution system consists of 1,400 ft of 2 in. diameter wrought iron pipe with two branches of 1 1/4 in. plastic lines 400 and 200 ft long. The annual charge is $60, billed quarterly

BLACK POINT WATER COMPANY

GENERAL

The Black Point Water Company, which originated in 1924, serves the center part of the Black Point peninsula, bordered on the south by Bond Street and on the north by Billow Road. The Water Company, which is only a seasonal operation, is privately owned and operated. The system is opened each year in April and shut in mid-November.

Elevations range from sea level to 60 ft. There are 335 services connected to the system; 75 houses in the area depend on private wells. Estimated population during weekend periods may reach 2,500. Estimated consumption varies between 50,000 and 125,000 gpd.

SOURCE OF SUPPLY

DESCRIPTION

There are three existing wells and one under construction. As soon as the new well is put in service, Well No. 1 will be used for emergency only.

Well No. 1: 4 in. drilled well, depth 201 ft, yield 30 gpm.
Well No. 2: 8 in. drilled well, depth 250 ft, yield 65 gpm.
Well No. 3: 8 in. drilled well, depth 250 ft, yield 65 gpm.

WELL PUMPING

In each well a vertical centrifugal pump is installed, equipped with 10 hp motors for Wells Nos. 1 and 3 and 7.5 hp for Well No. 2. The pumps operate on automatic control from the reservoir.

REMARKS

A 20 ft by 25 ft garage type frame structure houses Well No. 1 and also serves as storage room. The other two wells are housed in approximately 8 ft by 8 ft sheds, one of frame and the other of concrete block.

EMERGENCY	One gasoline motor is in the storeroom for emergency power.

TREATMENT

The supply is untreated.

TRANSMISSION AND DISTRIBUTION

GENERAL	The system consists of 2 and 4 in. pipes, well looped. The pipes do not have frost cover. Valves are located at intersections. It is estimated that there are approximately 20 valves.
MATERIALS AND LENGTHS	4 in. and 2 in. galvanized iron pipes; total length of the system is approximately 5 miles. House connections are 3/4 in. galvanized iron.
FIRE PROTECTION	There are 10 hydrants.

STORAGE FACILITIES

LOCATION	At the end of Billow Road.
CAPACITY AND TYPE	50,000 gal elevated steel tank, 125 ft high.
CONTROL	Float control operates the pumps; overflow protection is provided.

OPERATION OF SYSTEM

DESCRIPTION	The system is automatic. The pumps are started by the float control from the elevated tank. First, Well No. 1 starts, then Well Nos. 2 and 3. Water consumption restrictions are imposed on the consumers.

WATER QUALITY

Samples taken by the State Health Department indicated a relatively high iron and manganese content. High coliform count (MPN 7) was found in Well No. 2, but after shut-down and disinfection dropped to zero.

MAINTENANCE

The owner operates the system. For repair work a local contractor is called in.

WATER RATES

Charges are based on fixture counts. Average charge for the season is $28.

REFERENCES

The system was installed and is presently being expanded by Aetna Engineering.

CAMP DEMPSEY

GENERAL

Camp Dempsey is a National Guard training camp. It is owned and operated by the Military Department of the State of Connecticut.

The camp, established in 1936, is located on the west bank of the Niantic River approximately 2,000 ft north of the Pennsylvania Railroad right-of-way. The entire area encompasses approximately 90 acres and is almost level, 15 to 20 ft above sea level.

Population, in summer and on weekends, ranges between 400 and 2,700. During these periods approximate average daily water consumption is 25,000 gal. There are less than 25 full-time residents.

SOURCE OF SUPPLY

DESCRIPTION	The source of supply consists of two 12 in. drilled gravel packed wells located at the end of Clark Street. Well No. 1 is 110 ft deep

and Well No. 2 is 120 ft. The combined yield of the two wells is approximately 150 gpm; however, Well No. 2 is the better producer.

WELL PUMPING — Both pumps are identical vertical turbine pumps having a rated capacity of 100 gpm and 165 ft discharge head. The pumps were manufactured by the American Well Works and have 7.5 hp motors.

CONTROL — Both pumps work simultaneously, controlled by pressure switches. They are housed in identical 8 ft by 8 ft masonry structures. New pumps were installed in 1959 and 1964.

TREATMENT

The supply is untreated.

TRANSMISSION AND DISTRIBUTION

DESCRIPTION — The system consists of a transmission line from the wells to the elevated storage tank and distribution lines from the storage tank to the barracks.

MATERIAL AND LENGTHS — Length of gridiron is unknown. Approximately 2,000 ft of 10 in. steel pipe is the transmission line; the distribution system consists of 8 in. welded steel and cast iron pipes.

FIRE PROTECTION — There are 12 fire hydrants.

STORAGE FACILITIES

LOCATION — At the northeast corner of the reservation.

CAPACITY AND TYPE — 100,000 gal steel elevated tank.

CONTROL — Automatic pressure control to the pumps, with overflow protection.

OPERATION OF SYSTEM

DESCRIPTION — It is an automatically operated system, the pumps starting at 56 psi and stopping at 50 psi. This close pressure setting indicates that only a small part of the tank capacity is used for welfare purposes and the majority of the 100,000 gal storage capacity is reserved for fire fighting.

The tank is flushed once a year when the camp is closed.

MAINTENANCE

The system is maintained and operated by a permanent state employee.

REFERENCES

The pumps and control were installed by Aetna Engineering.

CARRIAGE HILL

GENERAL

The subdivision known as Carriage Hill Corporation has a public water supply system, installed in 1960, which is owned and operated by Suburban Water Service, Inc.

The subdivision is located south of Roxbury Road and west of Red Brook. The area is flat at El 100.

There are 100 services, supplying an estimated population of 340. Average daily water consumption is 20,000 gal. Services are all metered and a master meter measures total output.

SOURCE OF SUPPLY

DESCRIPTION — There are two wells in the system, but No. 2 is out of service.

	No. 1 Gravel packed: 8 in. dimaeter, 63 ft deep, yield 110 gpm. No. 2 Driven: 8 in. diameter, 38 ft deep.
WELL PUMPING	No. 1: 75 gpm centrifugal pump equipped with a 7 1/2 hp motor. No. 2: 130 gpm, presently not used.
REMARKS	The pump is installed in a 6 ft diameter concrete pit.
EMERGENCY	A gasoline driven generator provides standby power.

TREATMENT

DESCRIPTION	Two Ferro-Sand filters are used for iron removal. Each filter has a capacity of 38 gpm. The filters are recharged every 20 days. They remove color and reduce iron content from 0.9 mg/l to 0.2 mg/l. A hypochlorinator is used for chlorinating the supply. Soda ash is used for pH adjustment.
REMARKS	The equipment is housed in a 20 ft by 30 ft masonry-wood frame building. The storage tanks are partially embedded in the wall of the structure.

TRANSMISSION AND DISTRIBUTION

GENERAL	The gridiron consists of an 8 in. cast iron loop with the well located at the center. A single line extends southerly on Hill Drive.
MATERIALS AND LENGTHS	8 in. cast iron and 6 in. cast iron. Total length of pipes is 1.69 miles.
PRESSURES	Pressures in the distribution system range from 20 psi to a maximum of 50 psi.

STORAGE FACILITIES

Two pressure tanks, 1,000 gal each. Two storage tanks, 5,000 gal each. All tanks are located in the treatment building.

OPERATION OF SYSTEM

It is a hydropneumatic system with the well pumps providing the pressure. Automatic pressure switches are set at 45 and 65 psi.

WATER QUALITY

Samples taken by the State Health Department from the distribution system showed high ammonia nitrogen at 0.22 mg/l and ABS of 0.23 mg/l, indicative of pollution from subsurface sewage disposal systems. Iron content was reduced from 0.6 mg/l to 0.2 mg/l, a satisfactory level.

WATER RATES

Rates are $1 per 1,000 gal for the first 16,000 gal and 50¢/1,000 gal thereafter, on a quarterly basis.

CONNECTICUT STATE FARM FOR WOMEN

GENERAL

The Connecticut State Farm for Women, a State Correctional Institution established in 1934, covers an extensive area on the north and east shores of Bride Lake. The topography of the area is gently rolling from higher elevations of 60 ft to the lake level of 13.

In addition to the ten large buildings, there are 9 staff houses connected to the system and a number of smaller installations. Estimated population is 250. Estimated daily water consumption is 35,000 gal, of which approximately 10,000 gal are used for a laundry which also serves other State institutions.

SOURCE OF SUPPLY

DESCRIPTION	The source of supply is a 20 ft diameter dug well, approximately 30 ft deep, located approximately 50 ft off Bride Lake. The well is located in a concrete pit adjacent to a large pumphouse.

WELL PUMPING — Two horizontal centrifugal pumps are installed, each having a rated capacity of 125 gpm, with 15 hp motors. The pumps are located in a large pumphouse, which is in effect a dry-well, since the dug well is located outside the pumphouse with a common wall construction.

REMARKS — The pumphouse was constructed to house large fly-wheel positive displacement pumps and also 5 pressure tanks which are built into the wall of the structure. The original equipment is still there, but not in use

TREATMENT

GENERAL — Chlorination for disinfection and soda ash injection for pH control is practiced.

DESCRIPTION — A small hypochlorinator is used. Soda ash is injected with identical equipment. The chemical feed pumps operate with the main pumps.

TRANSMISSION AND DISTRIBUTION

GENERAL — The system consists of 4 in. and 6 in. steel pipes with shut-off valves located at major branches. There are long single lines feeding the isolated buildings. The estimated total length of the network is 2 1/2 miles. There are 15 hydrants.

PRESSURES — Pressures range from 30 to 50 psi, according to location. The overflow elevation in the reservoir is at approximately 150 ft. There is no service connection below 30 ft El. Some of the pipes produce extensive head losses.

STORAGE FACILITIES

LOCATION — A standpipe is located along Roxbury Road near the Roxbury Park development.

CAPACITY AND TYPE — It is a 42 ft high steel tank, with a 180,000 gal capacity.

CONTROL — Pumps are controlled by a float-operated telecontrol. Only the upper 5 ft volume is needed for welfare purposes; the rest of the reservoir serves as fire protection reserve.

OPERATION OF SYSTEM

DESCRIPTION — It is an automatic system, which operates on a float control mechanism. In case of level drop in the storage tank, the pump in the well house will automatically start. Chemical solutions are prepared daily and the chemical feed pumps work automatically, together with the main pump.

WATER QUALITY

Samples taken from the dug well both before and after treatment were found safe for drinking purposes. pH was 6.9, total hardness, 58 mg/l.

DODGE TOWNE HOUSE APARTMENTS

GENERAL

This apartment house development is owned and operated by the Stevens Associates, Inc., a development firm. The property consists of 22 acres of mostly wooded land located on the east side of Pataguanset Road, about 4/10 of a mile from Route 161. The apartment complex, which is composed of 5 buildings with a total of 44 units, is located on a knoll about 500 ft off Pataguanset Road. Plans call for 60 units ultimately. The soil in this area consists of sand and gravel of considerable depth. Present estimated population is 100, and average daily water consumption is estimated to be 5,000 gal.

SOURCE OF SUPPLY

DESCRIPTION — The well is located about 75 ft east of the private road leading to the apartments. The well is 275 ft deep and 6 in. in diameter. It yields 25 gpm.

WELL PUMPING	A 3 hp submersible pump is installed, having a pumping capacity of 60 gpm.
REMARKS	The well is housed in a concrete block building, about 15 ft by 15 ft, having a pitched roof with a covered access hole. An electrical heating unit is installed in the building.

PUMPING

GENERAL	A high pressure booster pump is installed in the pumphouse.
CAPACITY	The pump is a 5 hp horizontal centrifugal pump having a capacity of 70 gpm at 60 psi.
CONTROL	Automatic pressure control.

TRANSMISSION AND DISTRIBUTION

GENERAL	The system is not completed as of the date of this report. The water mains branch after the pump station to serve the northern and southern sections of the development.
MATERIALS	A 6 in. asbestos cement feeder conveys water from the pump station to the main road for future connection to the Town water system. 4 in. asbestos cement pipes are laid throughout the system with a limited amount of 3 in. plastic lines at the ends. Valves are spaced to allow shutting off parts of the system. There are no meters or individual service lines.

STORAGE FACILITIES

LOCATION	In the pumphouse.
CAPACITY AND TYPE	A 5,000 gal steel storage tank and a 1,000 gal pressure tank.
CONTROL	A float control in the storage tank operates the well pump; a pressure switch operates the booster pump.

OPERATION OF SYSTEM

DESCRIPTION	It is a hydropneumatic system. The well pumps are started if the level drops in the storage tanks; the booster pumps start on pressure control from the pressure tanks. Pressure switches are set at 35 and 58 psi. A 1/2 hp air compressor is connected to the pressure tank.

WATER QUALITY

Samples collected by the State Health Department indicated that the water was bacteriologically safe. The chemical findings indicated iron at 1.4 mg/l and manganese at 0.29 mg/l. The figure for turbidity was 9. The pH of the water was a low 5.9. Treatment equipment was not installed, since plans call for the abandonment of the well and supply by the new municipal source.

WATER RATES

Water is provided as part of the monthly rental charge.

MAINTENANCE

The system is maintained and operated by the owners' construction force.

REMARKS

Plans call for connection to the municipal supply. The distribution system was installed keeping this objective in mind. A master meter will be used to purchase municipal water and at the time of connection the well supply will be abandoned and the equipment salvaged.

REFERENCES

The system was installed by Aetna Engineering.

EAST LYME WATER COMMISSION

GENERAL

The Water Department of the Town of East Lyme provides public water supply to a limited part of the Town. The Water Department is governed by the Board of Water Commissioners which has five appointed members; the operation is supervised by a full-time superintendent.

The service area, located northwest of Niantic Bay, is bisected by the Penn Central Railroad right-of-way. The present service area covers less than a square mile. The original system, to serve the Seaside Sanatorium, was installed in 1922. Since the time of the original installation, additions to the system have been made to serve a larger area of Niantic. Known additions were made in 1946, 1948, 1952, 1957, 1964 and 1965.

The topography of the service area is flat. Elevations range from sea level to 50 ft.

There are 270 services in this system, all of them metered. The estimated population of the service area is 578. Average daily consumption is 70,000 gal.

SOURCE OF SUPPLY

DESCRIPTION	The water supply is taken from the Dodge Pond well located about 175 ft south of the shore of Dodge Pond. This is a dug well with concrete side walls and an open bottom. The well casing is rectangular in shape, 16 ft long by 5 1/2 ft wide. The total depth of the well is about 32 ft and the water depth is about 6 ft.
WELL PUMPING	The pumping equipment consists of two vertical turbine pumps with 150 gpm and 300 gpm capacities.
REMARKS	A frame building with a concrete floor slab covers the well. The well house is enclosed within a 70 ft by 70 ft fenced area.

TREATMENT

The supply is untreated.

TRANSMISSION AND DISTRIBUTION

GENERAL	The system consists of 6 to 10 in. diameter cast iron mains and an elevated storage tank which provides pressure to the system.	
MATERIALS AND LENGTHS	10 in. cast iron	8,752 ft
	8 in. cast iron	2,588 ft
	6 in. cast iron	8,976 ft
	Total length	20,316 ft or 3.9 miles
	There are 22 fire hydrants.	
PRESSURES	Approximately 30 - 50 psi in the service area.	

STORAGE FACILITIES

LOCATION	The "Seaside Tank" is an elevated storage tank located on Columbus Avenue just south of the railroad tracks.
CAPACITY AND TYPE	34 ft high; diameter 22.5 ft; capacity 100,000 gal; overflow El 173.7; base about 100 ft above ground.
CONTROL	A float control in the tank operates the horizontal pumps at the well.

WATER QUALITY

There was bacteriological contamination in the well; however, the problem was alleviated by disinfection of the well. The water quality is somewhat corrosive; the iron and manganese content is high, 0.5 mg/l.

WATER RATES

First 20,000 gal $25 semi-annually; then 50¢ to 35¢ per 1,000 gal.

MAINTENANCE

The system is maintained by town forces.

PLANS AND REFERENCES

Fenton G. Keyes, consulting engineers, recommended a town-wide water system. This system, which will cost an estimated $3,780,000, was approved by the Town Meeting.

The program will provide 61 miles of mains which would serve virtually all of the developed and developing portions of the Town. A 1.5 mil gal storage tank at the quarry and a new supply are included. In the beginning it is planned to use large capacity gravel packed wells. Ultimately, it is recommended the Town develop a surface supply on the Four Mile River.

GIANT'S NECK BEACH ASSOCIATION

GENERAL

Giant's Neck Beach Association is a seasonal residential community served by a privately owned and operated system. Started in 1922, the utility is opened April 1 and closed November 5 each year.

The service area is located just east of Giant's Neck Road and south of the Penn Central Railroad right-of-way. The topography of the area is sloping, from El 50 at the Railroad to sea level. There are 90 services connected to the system. The average summer population is 400, and the average daily water consumption is 20,000 gal.

SOURCE OF SUPPLY

DESCRIPTION

Three wells constitute the supply. Well No. 2 was abandoned, due to its small yield.

Well No. 1: 6 in. drilled well, depth 266 ft, at Hilltop Road.
Well No. 3: 6 in. drilled well, depth 143 ft, at Bright Brook.
Well No. 4: 36 in. dug well, depth 18 ft, at Bright Brook.

WELL PUMPING

Well No. 1 is pumped with a submersible pump having a capacity of 22 gpm.
Well No. 3 is pumped with a vertical centrifugal pump having a capacity of 10 gpm; the motor is 3/4 hp.
Well No. 4 has a 25 gpm positive displacement pump.

REMARKS

Well No. 1 is housed in a 32 ft by 22 ft frame structure. Wells 3 and 4 are in an 8 ft by 9 ft frame and concrete block structure.

TREATMENT

The supply is untreated.

TRANSMISSION AND DISTRIBUTION

GENERAL

The system consists of iron pipes laid at a shallow depth. The system is looped to a limited degree. The dead-end lines have a a blow-off at the end. Gate valves are located at each intersection. There are no meters in the system.

MATERIALS AND LENGTHS

4 in. pipe	400 ft
3 in. pipe	1,000 ft
2 1/2 in. pipe	1,480 ft
2 in. pipe	1,420 ft
1 1/2 in. pipe	7,380 ft
Total length	11,680 ft or 2.2 miles

PRESSURES

Pressure in the system ranges between 30 and 45 psi according to location and elevation.

STORAGE FACILITIES

LOCATION

A 10,000 gal pressure tank at Well No. 1 and a 300 gal pressure tank at Well Nos. 3 and 4.

CAPACITY — Total capacity, 10,300 gal.

CONTROL — Both tanks operate on pressure control.

OPERATION OF SYSTEM

DESCRIPTION — It is a hydropneumatic system, with pressure switches set at 40 and 50 psi.

WATER QUALITY

GENERAL — Samples collected by the State Health Department showed that Well No. 1 is high in chloride, sodium, hardness and sulfate. Well No. 4 was found to have a low pH. The mixing of the different well supplies improves these characteristics. The water was found to be bacteriologically safe for drinking.

WATER RATES

A flat rate is charged for the season, depending on the number of fixtures. Average charge is $50 per season.

GIANT'S NECK HEIGHTS

GENERAL

Giant's Neck Heights development is largely a resort residential area served by a privately owned water utility, originating in 1930.

The service area, located just east of Giant's Neck Road and north of the Penn Central Railroad right-of-way, covers approximately one-half square mile. The area is slightly sloping from a high elevation of 100 to El 50 at the railroad.

There are 95 services; the estimated population is 400, which may be considerably more during summer weekends.

SOURCE OF SUPPLY

DESCRIPTION — The source of supply consists of two drilled wells and a spring.

Well No. 1: diameter 6 in., depth 150 ft.
Well No. 2: diameter 6 in., depth 240 ft.

WELL PUMPING — Two submersible pumps discharge water into a basin, which is also spring fed. The size of the spring is 15 ft by 9 ft and 3.5 ft deep. The combined yield of the system is approximately 60 gpm.

REMARKS — The wells are housed in a wooden shed. The discharge pipe is a plastic pipe laid on the ground. The basin is covered with a loosely fitting roof.

PUMPING

DESCRIPTION — The two submersible pumps have a capacity of 20 gpm each; two booster pumps take their suction from the basin and deliver water into the system. These pumps are horizontal centrifugal types with a combined capacity of 60 gpm.

TRANSMISSION AND DISTRIBUTION

GENERAL — The system consists of mostly galvanized iron pipes laid on the ground surface or immediately below it, with an average cover of 4 in. As a consequence of this construction, there are numerous breaks each season. The lines are single lines with shut-offs at the junction points.

MATERIALS AND LENGTHS

2 1/2 in. galvanized iron pipe	200 ft
1 1/2 in. galvanized ieon pipe	2.5 miles
1 in. galvanized iron pipe	2.0 miles
3/4 in. galvanized iron pipe	1/4 mile
Total length, approximately	5.0 miles

There are no meters in the system.

PRESSURES — Pressures in the system range from 30 to 80 psi.

STORAGE FACILITIES

LOCATION — At pump shed.

CAPACITY AND TYPE — 10,000 gal pressure tank.

CONTROL — Automatic pressure control.

OPERATION OF SYSTEM

DESCRIPTION — One of the pumps is float controlled, the other has a manual on-off control. From the concrete basin, the booster pumps deliver water into the pressure tank and the system. It is a hydropneumatic system, with pressure switches set at 72 and 85 psi.

WATER QUALITY

Samples collected by the State Health Department showed a color of 15 units, a turbidity of 5 units, a pH of 6.4. The water was found to be safe for drinking purposes.

WATER RATES

A flat rate of $65 is charged for the season.

REMARKS

The owners plan to discontinue the system.

LAUREL HILL ACRES

GENERAL

The water company serving the Laurel Hill Acres subdivision was construction in 1958 and is owned and operated by Walter Charbonnier, developer. The development is located on the east side of Route 161, approximately 3/4 mile south of the Connecticut Turnpike.

The area is gently sloping from 50 ft El to 140 ft.

There are 75 services; the estimated population is 280. All services are metered, but the meters are not in use. Estimated average daily consumption is 17,000 gal.

SOURCE OF SUPPLY

DESCRIPTION — The source of supply is an 8 in. diameter, 85 ft deep drilled gravel packed well, located on the west side of Route 161.

WELL PUMPING — A 200 gpm submersible pump delivers water into a pressure tank, located on the east side of Route 161.

REMARKS — The well is housed in an 8 ft by 8 ft concrete pit.

TREATMENT

DESCRIPTION — The water is treated to reduce iron and manganese content, and equipment is installed for chlorination.

LOCATION — On the east side of Route 161, approximately 200 ft from the pumphouse.

PROCESS — A Hungerford and Terry pressure filter iron removal plant, consisting of 3 units. A hypochlorinator is installed but not used.

REMARKS — The treatment equipment is housed in a 16 ft by 24 ft concrete pit.

TRANSMISSION AND DISTRIBUTION

GENERAL — The distribution system consists of 4, 6 and 8 in. cast iron pipes, all individual lines with no looping.

MATERIALS AND LENGTHS	4 in. cast iron	3,000 ft
	6 in. cast iron	6,000 ft
	8 in. cast iron	300 ft
	Total length	9,300 ft or 1.75 miles

Service connections are 3/4 in. copper. There are approximately 12 valves at main intersections.

PRESSURES — Pressure in the system ranges from 30 psi to 70 psi.

FIRE PROTECTION — There are five fire hydrants, presently used for flushing only.

STORAGE FACILITIES

LOCATION — Opposite the well site on the east side of Route 161, buried in the ground.

CAPACITY AND TYPE — 10,000 gal steel pneumatic tank.

CONTROL — Pressure switches in this tank operate the pump.

OPERATION OF SYSTEM

DESCRIPTION — The well pumps are the only pumps in the system and thus provide enough pressure to pass the water through the filters and pressure tanks to the customers. It is a hydropneumatic system with the pressure switches set at 68 and 86 psi.

The filters are backwashed once a week or when a 10 lb pressure drop is noticed.

WATER QUALITY

Samples taken from the distribution system by the State Health Department showed the following characteristics:

Color	0-5 units
Odor	earthy occasionally
Turbidity	0-2 units
pH	6.4 - 6.9
Iron	0 - 0.2 mg/l

WATER RATES

A flat rate of $48 per year is charged.

REFERENCES

Earl Sexton of Hartford installed the system.

MOTELS

There are three motels in East Lyme. All three depend on private individual supplies. The three motels are the following:

1. Rocky Neck Motel
2. Connecticut Yankee Motor Inn
3. Starlight Motor Inn

All three systems happen to be quite similar both in equipment and consumption. All three depend on single drilled wells and all are hydropneumatic. It is estimated that each motel uses approximately 5,000 gpd when fully occupied.

ROCKY NECK STATE PARK

Rocky Neck State Park is located at the southwestern corner of East Lyme. The Park is maintained by the State Park and Forest Commission and accommodates campers and bathers. The average

summer camping population is approximately 1,000 persons and the peak beach use is approximately 10,000 people.

The source of supply is a system of individual wells with very short water lines serving their immediate areas and buildings. There are 19 wells throughout the park; the depths of these wells range from 16 to 23 ft. There is an occasional slight saline intrusion into the wells; for this reason 5 wells are out of commission.

The pipes are of galvanized iron. Throughout the camping grounds water is supplied by manual positive displacement pumps. There are submersible pumps installed for the buildings.

Laird E. Newell, Consulting Engineer from Hartford, has been engaged to design a central water supply system for the park, which will include a 40 ft diameter, 45 ft high standpipe.

ROXBURY PARK WATER COMPANY

GENERAL

The subdivision known as Roxbury Park is supplied by the Roxbury Park Water Company, constructed in 1963, and owned by Stevens Associates, a private corporation. The subdivision consists of 1/2 acre lots with medium priced homes.

The subdivision is located south of Roxbury Road, about 1/2 mile east of Bride Lake. The area is gently rolling, El ranging from 80 to 110 ft.

There are 122 services for 107 houses and a 16 unit apartment building, with an estimated population of 450. Average daily water consumption is 25,000 gal.

SOURCE OF SUPPLY

DESCRIPTION	The source of supply is three drilled wells. Wells Nos. 1 and 2 are located at the north end of the area; Well No. 3 is at the south end. Drilled Well No. 1: diameter 6 in., depth 350 ft, yield 35 gpm. Drilled Well No. 2: diameter 6 in., depth 325 ft, yield 22 gpm. Drilled Well No. 3: diameter 6 in., depth 200 ft, yield 24 gpm.
WELL PUMPING	Well No. 1 is located in the north pumphouse and Well No. 2 is located just outside this structure. Well No. 1 has a vertical Deming turbine pump with a 3 hp motor. Well No. 2 has a submersible pump, also with a 3 hp motor. Well No. 3 pump and motor are identical to those of Well No. 1.
REMARKS	The north pumphouse is a 20 ft by 20 ft masonry structure; the south pumphouse is an 8 ft by 8 ft concrete block pit. The combined capacity of the pumps is approximately 75 gpm. Both pumphouses have provisions for heating. A sump pump is installed in the north station.
EMERGENCY	A gasoline driven pump is installed in the north pumphouse.

TREATMENT

The supply is basically untreated, but chlorine is injected intermittently. A Hungerford and Terry model 30 plant is installed in the north pumphouse, but it is not connected.

PUMPING

DESCRIPTION	At the north station the well pumps deliver water into a storage tank and high pressure horizontal pumps transfer it into pressure tanks. At the south end the well pumps discharge directly into the pressure tanks. Location of the two high pressure pumps is in the pumphouse.
CAPACITY AND TYPE	Two identical pumps are horizontal centrifugal, with a 5 hp motor.
CONTROL	Both pumps operate on pressure control.

TRANSMISSION AND DISTRIBUTION

GENERAL	The distribution system consists of a loop and a single line, with the pumps being located at the two ends.

MATERIALS AND LENGTHS	4 in. asbestos cement pipe	2,840 ft
	6 in. asbestos cement pipe	7,581 ft
	Total length	10,421 ft or two miles

Service lines are 3/4 in. copper with shut off valves at each house. Valves are located at the major intersections.

PRESSURES — Pressure in the system ranges between 30 and 55 psi according to location.

STORAGE FACILITIES

LOCATION — A storage tank is located at the north station; pressure tanks are located at both stations. All tanks are embedded into the walls of the pumphouses.

CAPACITY AND TYPE — A 25,000 gal steel storage tank and two 2,500 gal pressure tanks at the north station, a 1,000 gal pressure tank at the south station.

CONTROL — A float control to the well pumps from the storage tank; pressure controls to the high service pumps from the pressure tanks.

OPERATION OF SYSTEM

DESCRIPTION — The system is hydropneumatic.

The south pump station starts if pressure drops to 35 psi. Shutoff point on this pump is 60 psi. The north station starts operating at 45 psi and stops at 57 psi. Consequently, the south station operates almost continuously with the exception of night hours. Air compressors are supplementing the pressure requirements at both stations.

WATER QUALITY

Samples taken from the distribution system by the State Health Department showed pH 7.0, traces of color at times, and all other constituents within the standards.

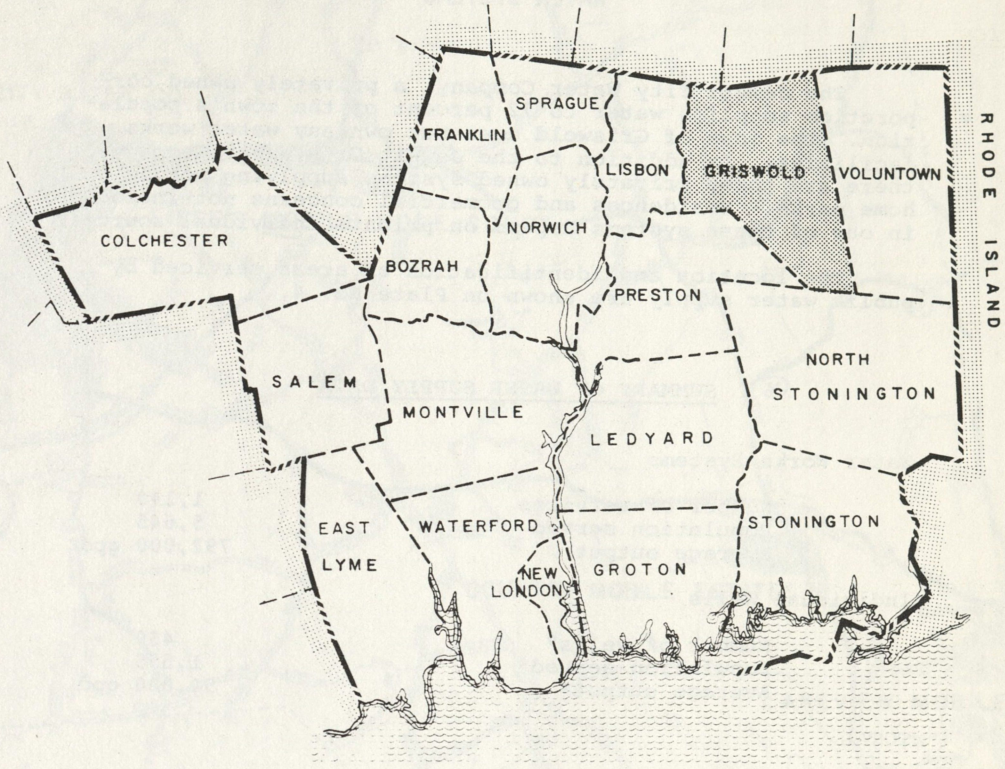
WATER RATES

A flat rate of $60 per year is charged, billed quarterly.

REFERENCES

The system was installed by Aetna Engineering.

GRISWOLD



GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Located along the northern border of the Region, Griswold has an area of 36.9 square miles. This includes the Borough of Jewett City which covers two-thirds of a square mile, along the town's western edge. The hilly terrain of Griswold is marked by numerous streams, fresh water swamps and ponds. Elevations range from 100 to 560 feet, but average between 200 and 350 feet.

TRANSPORTATION

Griswold is provided with excellent access to the Connecticut Turnpike which runs through the town. Other state highways serving the town are Routes 12, 164, 165, 138, and 201. Freight service is available from the New Haven Railroad.

INSTITUTIONS AND INDUSTRY

Griswold contains no major institutions. A variety of industries produce plastic wire and cable, textiles, and paper and rubber goods. Commercial activities are concentrated in the Borough of Jewett City.

GOVERNMENT

The form of government in Griswold consists of a board of selectmen, town meeting, and board of finance. The Borough of Jewett City is governed by a warden and four burgesses.

POPULATION

The 1960 population of 6,472 has grown to an estimated current level of 7,300. About two-thirds of this total is located in the Borough of Jewett City with the remainder scattered throughout the town.

WATER SYSTEMS

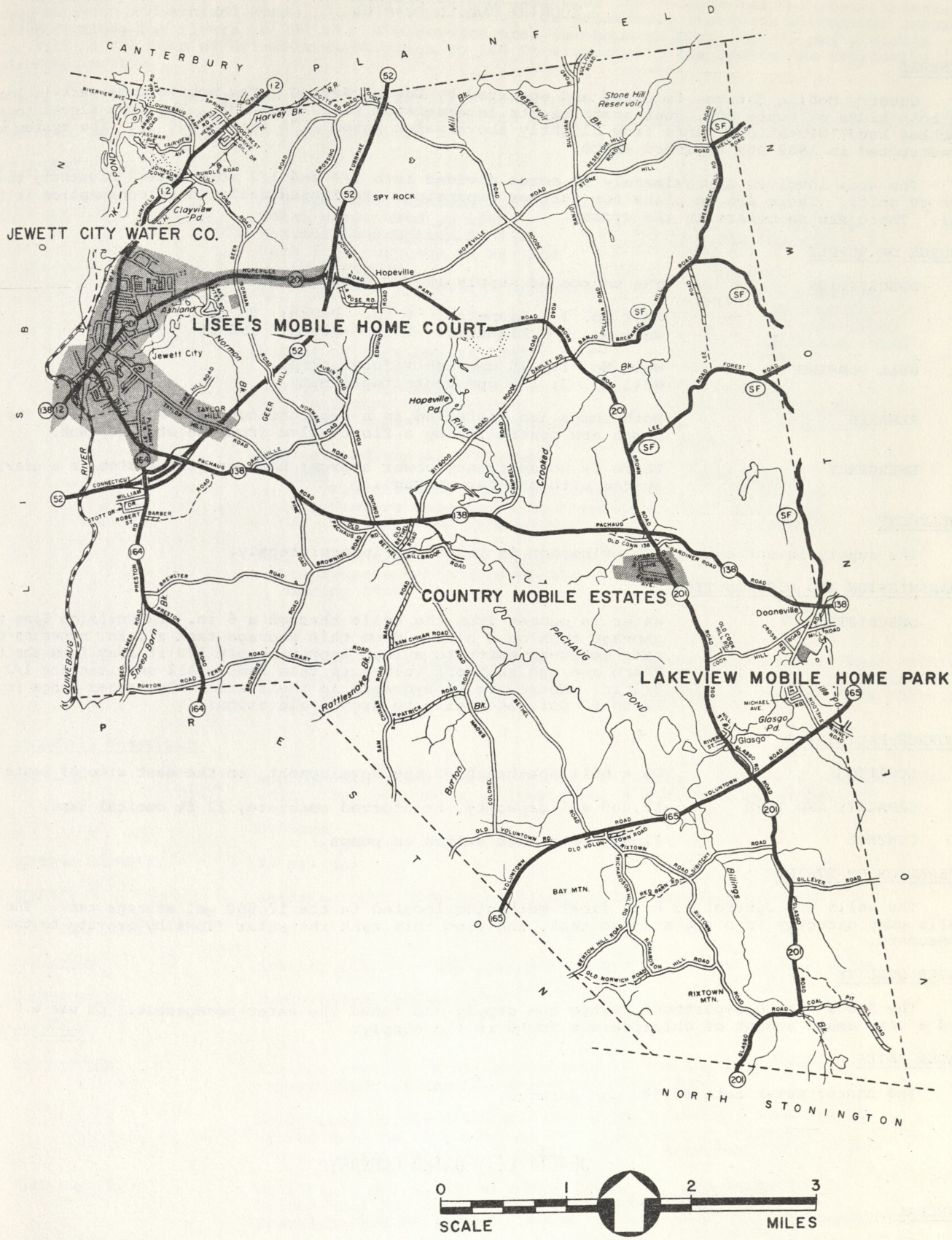
The Jewett City Water Company, a privately owned corporation supplies water to 72 percent of the town's population. The Town of Griswold does not own any water works facilities. In addition to the Jewett City Water Company, there are three privately owned systems supplying mobile home parks. Residences and commercial concerns not included in one of these systems depend on private individual sources.

The location and identification of areas serviced by public water supply are shown on Plate No. 4.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	1,140
Population served	5,645
Average output	792,000 gpd
Individual Wells	
Number of wells*	450
Population served*	1,555
Average output*	94,000 gpd
TOTAL	
Number of consumers	1,590
Population served	7,200
Average output*	886,000 gpd

* Estimated



TOWN OF GRISWOLD

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 4

COUNTRY MOBILE ESTATES

GENERAL

Country Mobile Estates is owned and operated by Edward Strnad. The mobile home park is located on both sides of Route 201, just south of its intersection with Route 138. The area slopes toward Pachaug Pond; elevations range from slightly above water level (170 ft) to 300 ft. The system was constructed in 1962 and expanded since.

The area involves approximately 50 acres divided into 1/4 and 1/2 acre lots. Presently there are 80 units. There are no plans for further expansion. Estimated daily water consumption is 12,000 gal. There are no meters in the system.

SOURCE OF SUPPLY

DESCRIPTION	The source of supply is two drilled wells. Well No. 1 - Diameter: 6 in. Depth: 85 ft Well No. 2 - Diameter: 6 in. Depth: 100 ft
WELL PUMPING	Well No. 1: 15 gpm centrifugal pump. Well No. 2: 35 gpm centrifugal pump.
REMARKS	Both pumps are installed in a separate concrete box drywell. The pumps are controlled by a float valve from the storage tank.
EMERGENCY	There is no emergency power source; however, the system is a gravity system with one-day storage.

TREATMENT

The supply is untreated. Chlorination is practiced intermittently.

TRANSMISSION AND DISTRIBUTION

DESCRIPTION	Water is pumped from the wells through a 6 in. transmission line to a storage tank on a hill. From this storage tank a 6 in. asbestos-cement main delivers water to a loop approximately 500 ft away from the tank. There are two shut-off valves in this loop. All services are 1/2 and 3/4 in. There are no hydrants in the system. Pressures range from 12 to 60 psi, according to ground elevations.

STORAGE FACILITIES

LOCATION	On a hill southeast of the development, on the east side of Route 201.
CAPACITY AND TYPE	12,000 gal capacity, reinforced concrete, 12 ft cubical tank.
CONTROL	Float-controlled switch on pumps.

OPERATION OF SYSTEM

The wells are controlled by a float mechanism located in the 12,000 gal storage tank. The wells pump directly into the storage tank, and from this tank the water flows by gravity to the consumers.

WATER QUALITY

The State Health Department tested the supply and found the water acceptable. pH was 6.8 - 7.1 and a very small amount of chloride was found in the supply.

WATER RATES

The annual water rate is $80 per service.

JEWETT CITY WATER COMPANY

GENERAL

The Jewett City Water Company is a privately owned corporation governed by a Board of Directors. The system operation is supervised by a full time superintendent.

The Borough of Jewett City is located at the confluence of the Pachaug and Quinebaug Rivers, between Aspinook and Ashland Ponds. Land in the Borough is relatively flat with elevations ranging from 100 ft along the rivers to 200 ft. The service area is shown on Plate No. 5. and includes Taylor Hill in the Town of Griswold which rises to 300 ft elevation. The system was originally constructed in 1895.

Total population served was estimated as 5,210 of which 3,450 reside in Jewett City, 1,660 in Griswold and 100 in Lisbon. The total water production and the industrial and commercial consumers are metered, but the individual homeowners are not.

PLANT OPERATING DATA

Average daily consumption in 1968	770,000 gal
Total water used in 1968	281.7 mil gal
Maximum consumption in 1968	1,063,000 gpd
Date of occurrence of maximum consumption	June 16
Distribution of water consumption	46% Domestic
	10% Commercial
	34% Industrial
	10% Unaccounted
Number of services in 1968	994
Number of services metered	52
Estimated population served	5,210
All inclusive consumption	148 gpd/cap
Estimated domestic consumption	66 gpd/cap

Largest individual consumers

Name	Consumption
1. Plastic Wire and Cable Company	110,000 gpd
2. Stevens Associates Apartments	30,000 gpd
3. Tilting Rock Trailer Park	25,000 gpd

Ratio of maximum month consumption to average month consumption during 1968	115.0%

SOURCE OF SUPPLY

DESCRIPTION — The source of supply is both surface water and auxiliary well water. The Stonehill Reservoir is the normal source of supply, with the wells pumped only when distribution pressure is lowered to a certain minimum figure.

Stonehill Reservoir

LOCATION — Approximately 4 miles northeast of Jewett City in the Town of Griswold. The reservoir is located on a 0.9 sq mi watershed.

SAFE YIELD — 0.5 mgd

STORAGE CAPACITY — 90 mil gal

QUALITY — Satisfactory, occasional slight color and odor problems.

YEAR COMPLETED — 1895

OPERATION — Gravity flow. A spillway discharges high flows into a brook.

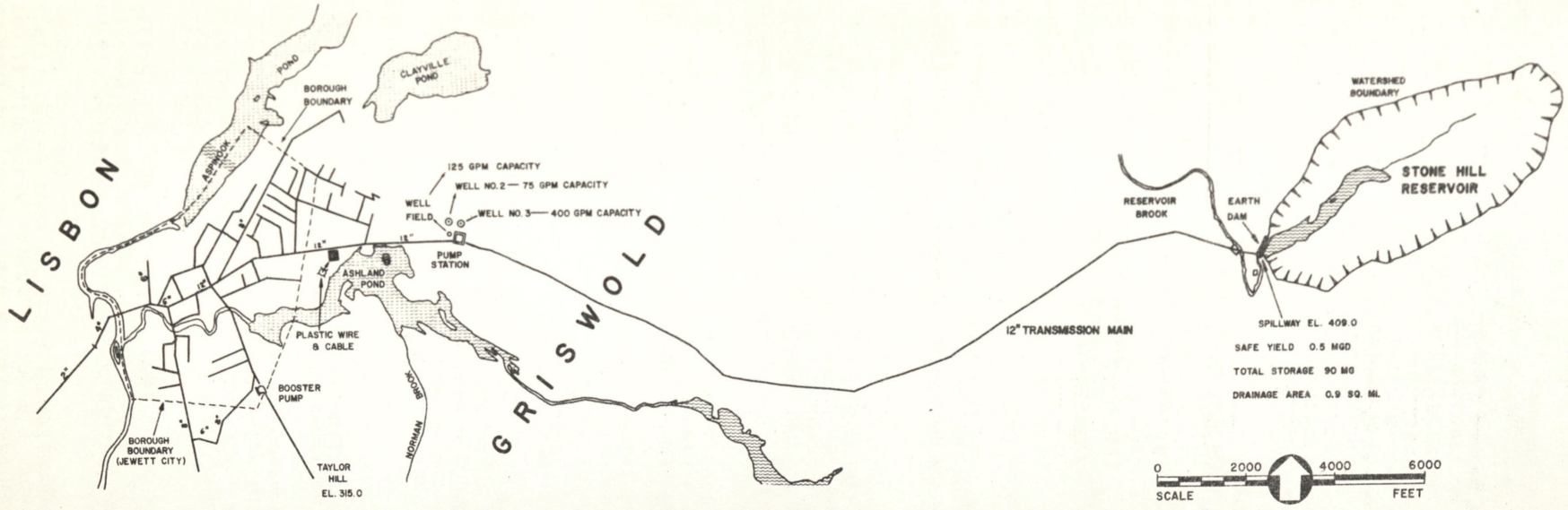
CONSTRUCTION — Rock-filled earthen dam.

WELL SUPPLIES

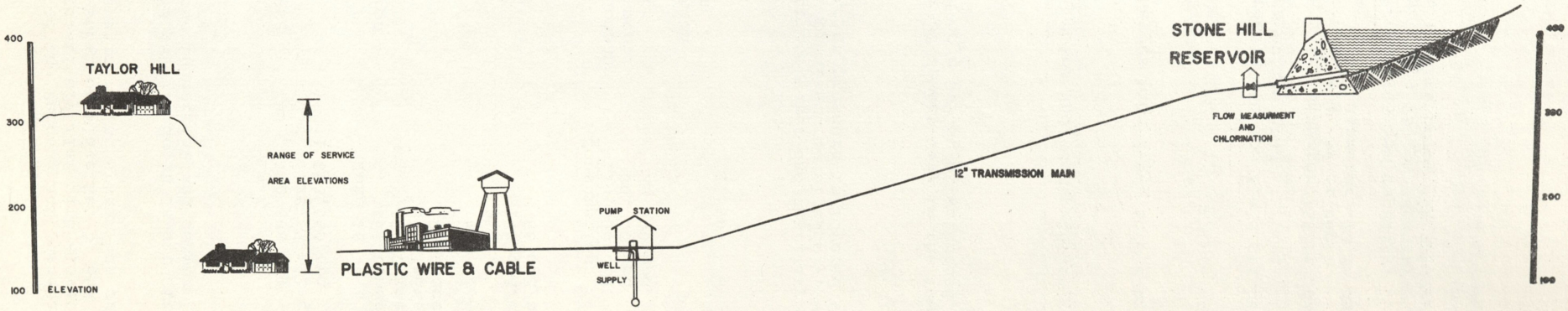
DESCRIPTION — All the various wells are located in the low field northeast from the intersection of Geer Road and Hopeville Road.

Well Field No. 2, 5 wells, each 2 in. diameter, 50 ft depth.
Driven Well No. 2 South, 12 in. diameter, 58 ft depth.
Gravel Packed Well No. 3 North, 12 in. diameter, 72 ft depth.

WELL PUMPING — Well Field No. 2, 25 hp vacuum pump, 125 gpm capacity.
Driven Well No. 2, 10 hp turbine pump, 75 gpm capacity.
Gravel packed Well No. 3, 40 hp turbine pump, 400 gpm capacity.



WATER SUPPLY DIAGRAM



SCHEMATIC FLOW DIAGRAM

JEWETT CITY WATER COMPANY

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 5

REMARKS — The vacuum pump is located in a concrete block building which also serves as maintenance shop and parts storage. The two turbine pumps are located in a 15 x 40 ft concrete block building. Both structures are in good condition.

EMERGENCY — No standby power is provided since normal flow is by gravity.

TREATMENT

Protection of water quality is by simple chlorination of the raw water, which is not filtered.

At Stonehill Reservoir a new BIF electrically operated automatic solution feed hypochlorinator was recently installed. The previously used hypochlorinator is used for standby equipment. The new chlorinator is controlled by a relay and solenoid valve attached to the venturi meter. The old standby chlorinator is BIF hydraulically operated, proportional to flow controlled, solution feed equipment.

Chlorination of the wells is "on-off" with pump motor, and chlorine feed rate is pre-set for the minimum required residual. A residual chlorine content of 0.5 ppm is maintained in the system.

TRANSMISSION AND DISTRIBUTION

GENERAL — The system consists of 15.5 miles of various size pipes, the majority being 6 in. in diameter. There are a few dead-ends in the gridiron, although the larger mains are looped.

MATERIALS AND LENGTH

Diameter in in.	Material	Length in ft	% of Total
16	Cast iron	145	0.2
12	Cast iron	12,870	15.7
10	Cast iron	12,946	15.9
8	Cast iron	1,050	1.3
8	Asbestos Cement	3,537	4.3
6	Cast iron	24,701	30.3
6	Asbestos Cement	14,382	17.7
4	Cast iron	950	1.1
2	Galvanized and steel lines	10,456	12.9
1	Miscellaneous	498	0.6
TOTAL		81,535	100.0

PRESSURES — The average pressure in the system is about 100 psi. Due to this relatively high pressure, some customers have installed pressure reducing valves. On Taylor Hill, which is on higher ground, a minimum pressure of 40 psi is maintained with a small booster pump.

FIRE PROTECTION — There are 81 hydrants. Plastic Wire and Cable Company has its own fire protection system.

BOOSTER PUMP

DESCRIPTION — A small booster pump located in a buried chamber is on the line boosting pressure to Taylor Hill customers. A 30 gpm capacity 2 hp pump is controlled automatically by a pressure switch.

STORAGE FACILITIES

Other than Stonehill Reservoir there is only a 1,000 gal pressure reservoir on Taylor Hill. Plastic Wire and Cable Company has a 100,000 and 50,000 gal capacity elevated tank for fire protection purposes.

OPERATION OF SYSTEM

The system normally functions as a gravity flow from the reservoir into the town. Stonehill Reservoir is approximately 200 ft above the highest service area with the exception of Taylor Hill. In case the pressure in the distribution system drops due to increased demand, the well pumps start up and the flow is supplemented from this source. At times of low water level in the reservoir, backflow may occur from the well pumping into the reservoir.

WATER QUALITY

At certain periods there are slight color and odor problems characteristic of unfiltered

reservoir flows in the area. The iron content is also rather high at times. During previous yea coliform group bacteria was found in the supply which was due to malfunctioning chlorination equi ment. This problem was resolved with the installation of new equipment.

WATER RATES

Residential rates are based on fixture counts and average $34 per year. Industrial and comm cial rates are on a step rate system per 1,000 gal, 39¢ to 15¢. Minimum charges range from $4 to $135 according to the size of the meter.

MAINTENANCE

The day to day maintenance and operation is accomplished by the superintendent and one helpe The company maintains a small office in Jewett City. Billings are sent out from Boston.

REFERENCES

The company did not retain consulting engineering service for the past years. Any improveme in their instrumentation system was provided by the BIF engineers.

LAKEVIEW MOBILE HOME PARK

GENERAL

The Lakeview Mobile Home Park is owned and operated by Peter Lazourack. It consists of approximately 9 acres of subdivided land with 38 mobile home lots. Each lot is approximately 5,000 sq ft.

Lakeview Mobile Home Park is located on the eastern edge of the Town of Griswold off Sheldon Road on the north shore of Doaneville Pond. Elevations range from 185 to 195 ft; the land is gent sloping. The present system was constructed in 1968 by Aetna Engineering. There are 38 services and the estimated population is 120. There are no meters in the system; estimated water consumpti is 7,200 gpd.

SOURCE OF SUPPLY

DESCRIPTION	The source of is a 6 in. diameter Artesian well, 55 ft. deep.
WELL PUMPING	There are two 3/4 hp pumps working on different pressure ranges. On spare pump is not connected. Pump capacities are approximately 20 gpm for each pump.
REMARKS	The well pumps and a part of the storage tank are installed in the owner's basement. Emergency power source is not available.

TREATMENT

The water is not treated.

TRANSMISSION AND DISTRIBUTION

GENERAL	The system consists of approximately 2,000 ft of plastic pipes. The main lines are 2 in. plastic lines and are not looped. Valves are located on the line and through hosing looping is possible. There are no meters or fire hydrants on the system.
PRESSURES	Pressure in the system ranges from 30 to 50 psi.

STORAGE FACILITIES

LOCATION	Partially built into the wall of the owner's basement.
CAPACITY AND TYPE	1,000 gal steel tank.
CONTROL	Automatic control.

OPERATION OF SYSTEM

DESCRIPTION	The well pumps are started on pressure switch control. At 55 psi one pump will start and when pressure further drops to 45 psi the

other pump will also start. A small air compressor maintains pressure in the storage tank, which serves as a pneumatic tank.

WATER QUALITY

According to the owner, the State Health Department regularly takes samples from the supply which is satisfactory.

WATER RATES

There are no separate charges for water service, which is included in the monthly rental charge.

MAINTENANCE

Day to day maintenance is accomplished by the owner.

LISEE'S MOBILE HOME COURT

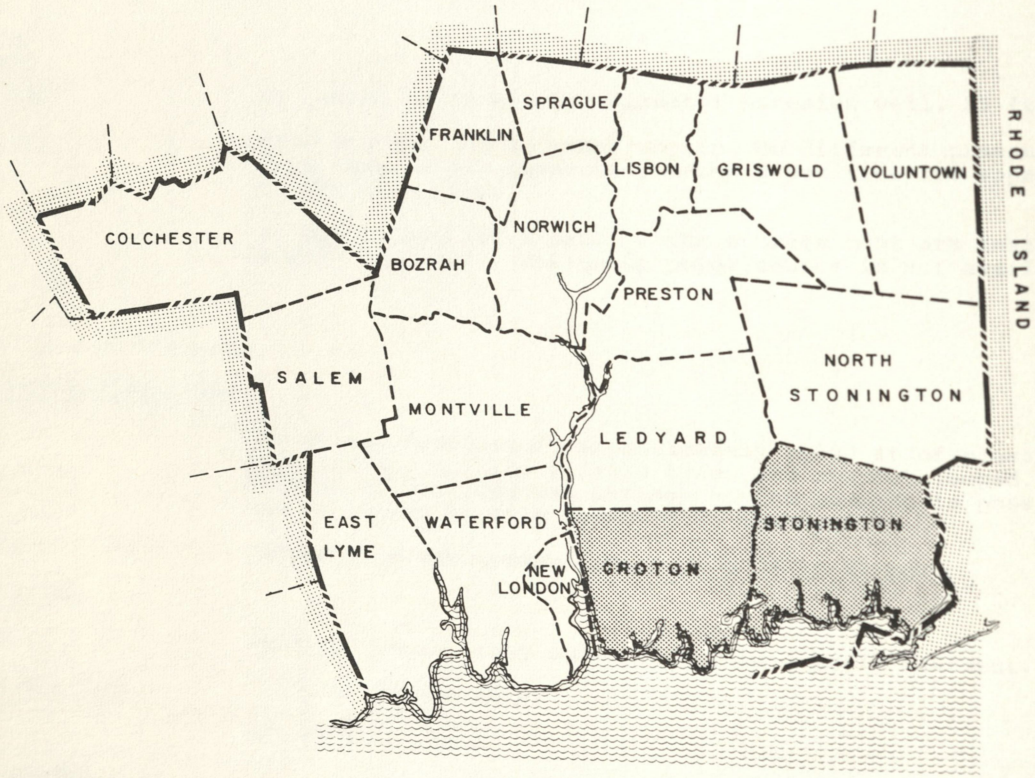
The Lisee's Mobile Home Court is owned and operated by Alphonso Lisee. The court is located on the west side of Norman Road, north of the Pachaug River. The area is slightly sloping; elevations range from 130 to 150 ft. There are presently 28 mobile homes on approximately 8 acres of subdivided land. The owner plans to extend the park to the 15 acre property he owns. Plans call for 50 units. The present estimated population is 65. The daily average estimated consumption is 3,250 gal. The system was installed in 1962.

The source of supply is a 6 in. diameter Artesian well, 295 ft deep. The well was rated to produce 25 gpm. A submersible 1 1/2 hp pump delivers water into a 240 gal pneumatic tank. The owner plans to replace this tank with a 500 gal unit. The pump is controlled by pressure switches set at 35 and 55 psi. The distribution system consists of approximately 1,500 ft of 1 1/4 in. plastic pipe. There are no meters. Water service is supplied as part of the rental fee.

GROTON

AND

STONINGTON



GROTON

GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Groton is located between the Thames and Mystic Rivers along the coast of Long Island Sound and has an area of 35.9 square miles. Elevations increase steadily from the coastal areas to almost 300 feet along the northern border of the town. Maximum relief exceeds 200 feet in some areas but the average vertical distance between valley floors and hilltops is about 150 feet.

TRANSPORTATION

Transportation facilities are excellent and include freight service by truck, rail, water, and air carriers. Passenger service is also available by bus and by airplane at Trumbull Airport. Three full interchanges on Interstate Route 95 are located in Groton. The town is also served by U.S. Route 1 and State Routes 12, 184, and 117.

INSTITUTIONS AND INDUSTRY

Major institutions include the U.S. Naval Submarine Base, the Mystic Oral School, and the Southeastern Branch of the University of Connecticut. Industrial activity includes shipbuilding, metal plating, heavy construction, precision castings, and the manufacturing of pharmaceuticals and chemicals.

GOVERNMENT

The City of Groton, a three-square-mile area at the western end of the town, has a mayor-council form of government, and the remainder of the town is governed through a town manager, town council, and representative town meeting.

POPULATION

Groton has grown from 29,937 to about 39,700 persons since 1960. High-density concentrations of population are found along the eastern and western edges of the town, while subdivisions with lower densities are found throughout the entire municipality. A large summer colony exists along the coast at Groton Long Point.

STONINGTON

GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Stonington has an area of 41 square miles and is located in the southeast corner of the Region, fronting on Long Island Sound. Its gently sloped hills reach heights of over 300 feet, but the average relief is only about 150 feet. The coastline is marked by numerous small beaches, rock outcroppings, tidal marshes, islands, and inlets.

TRANSPORTATION

Freight service is available by truck and rail. Highways serving Stonington include Interstate Route 95, U.S. Route 1, and State Routes 2, 27, 184, and 201.

INSTITUTIONS AND INDUSTRY

Stonington contains Mystic Seaport, a recreated 19th century whaling village which attracted more than 400,000 visitors in 1968. It also has a variety of important industries whose products include machinery, printing presses, soap, paper tubes and cones, plastics, castings, electrical parts, textiles, silvercel batteries, and velvet goods.

GOVERNMENT

The town is governed by a board of selectmen, town meeting, and a board of finance. The 200-acre Borough of Stonington is governed by a warden and six burgesses.

POPULATION

Stonington's population was 13,969 in 1960 and is estimated to be 16,200 now. The major portion of the population is found in three urbanized areas of the town: Pawcatuck, the Village of Stonington, and Mystic.

WATER SYSTEMS

The Towns of Groton and Stonington are discussed jointly, since the Mystic Valley Water Company serves communities in both towns and statistics are available only for service areas.

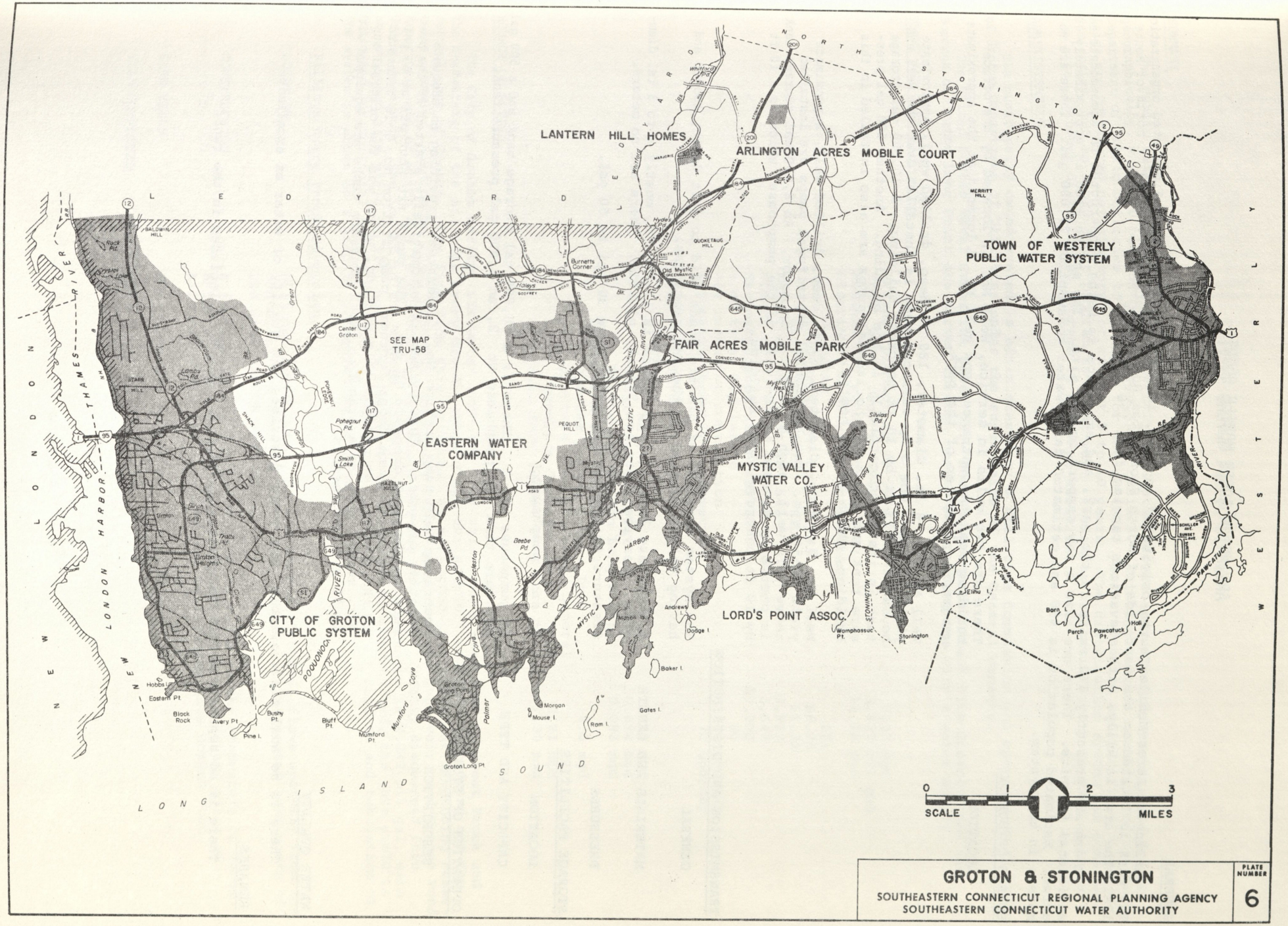
In the two towns there is one large municipally owned system, one large investor owned system, a fire district serviced by a municipality in Rhode Island, four small investor owned supplies, and one homeowners' association. The City of Groton system services a large part of the Town of Groton, the Mystic Valley Water Company serves a large part of both Groton and Stonington, approximately one square mile in the Pawcatuck area of Stonington is served from Westerly, Rhode Island, and the rest of the operations serve relatively small scattered areas in both towns.

The location and extent of service areas are shown on Plate No. 6.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	9,103
Population served	47,180
Average output	11,007,000 gpd
Individual Wells - Domestic	
Number of wells*	3,900
Population served*	13,120
Average output*	234,000 gpd
TOTAL	
Number of consumers*	13,003
Population served*	60,300
Average output*	11,241,000 gpd

* Estimated



GROTON & STONINGTON

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 6

ARLINGTON ACRES MOBILE COURT

GENERAL

Arlington Acres Mobile Court, originated in 1960, is a privately owned and operated organizat The park is located on the east side of North Stonington Road, (Route 201), 4,000 ft north of Route 184. The area is hilly, with elevations ranging from 150 to 220 ft.

There are presently 140 units in the park, and expansion is being constructed to accommodate additional 60 units. There are also a few campers on the site. The entire area is approximately acres. Estimated population is 450 and estimated daily water consumption 27,000 gal. There are no meters in the system.

SOURCE OF SUPPLY

LOCATION

There are two wells in service, Well No. 1, located by the office building near the entrance, and Well No. 2 located at the approximate geographical center of the park.

Well No. 1: 8 in. diameter, 180 ft deep, drilled well, approximate yield 12 gpm. One 3 hp vertical pump is installed over the well and housed in a 15 ft by 10 ft concrete building. A 10,000 gal storage tank is installed partially in the building. Another 500 gal pressure tank and two small horizontal pumps are also installed in this building, which is gas heated.

Well No. 2: 8 in. diameter, 60 ft deep, drilled well, approximate yield 40-50 gpm. Two horizontal centrifugal pumps are installed above this well, each having a 3 hp motor. An 8,000 gal storage tank is partially encased in the wall of the pumphouse, which is a 10 ft by 10 ft concrete block building.

TRANSMISSION AND DISTRIBUTION

GENERAL

The system consists of plastic pipes laid to 4 ft depth, looped and having valves located at the intersections.

MATERIALS AND LENGTH

Approximate length of the pipes is 17,000 ft, mostly 2 to 3 in. diameter. Service pipes are 3/4 in. plastic. There are no meters.

PRESSURES

Pressure in the system ranges from 30 psi to 50 psi.

STORAGE FACILITIES

LOCATION

At each pumphouse.

CAPACITY AND TYPE

At pumphouse No. 1. There is a 10,000 gal storage tank and a 500 gal pressure tank; at pumphouse No. 2, an 8,000 gal pressure tank.

OPERATION OF SYSTEM

DESCRIPTION

Generally only pump station No. 2 operates, providing an adequate quantity of water. This system is automatically started if the pressure in the tank drops to 50 psi. The pumps are shut off at 65 psi. In case the pressure drops further, pump station No. 1 is connected to the system. At present this station, which was the original supply, serves only as a standby. Both pressure tanks are equipped with small air compressors.

WATER QUALITY

There is no analysis available; the owner describes the quality of water as excellent.

REMARKS

There is no separate charge for water consumption, which is included in the rent.

CITY OF GROTON PUBLIC SUPPLY

SUMMARY

The public water supply system of the City of Groton serves approximately one-half of Groton, geographically, where 70 percent of the population resides. Existing sources are believed by the Department of Public Utilities to be ample for the next few years. Pumping and purification facilities are considered satisfactory for another 5 to 10 years. The distribution system has some deficiencies, but an improvement program is under way. Pressures are satisfactory in most parts of the area, although distribution storage is somewhat deficient.

ADMINISTRATION

The municipally owned system is administered by a Utilities Commission and operated by the City of Groton Department of Utilities under the supervision of the General Manager.

The United States Naval Submarine Base, Navy housing projects, Noank Fire District and the Borough of Groton Long Point are served through master meters from the City's water supply.

PLANT AND OPERATING DATA

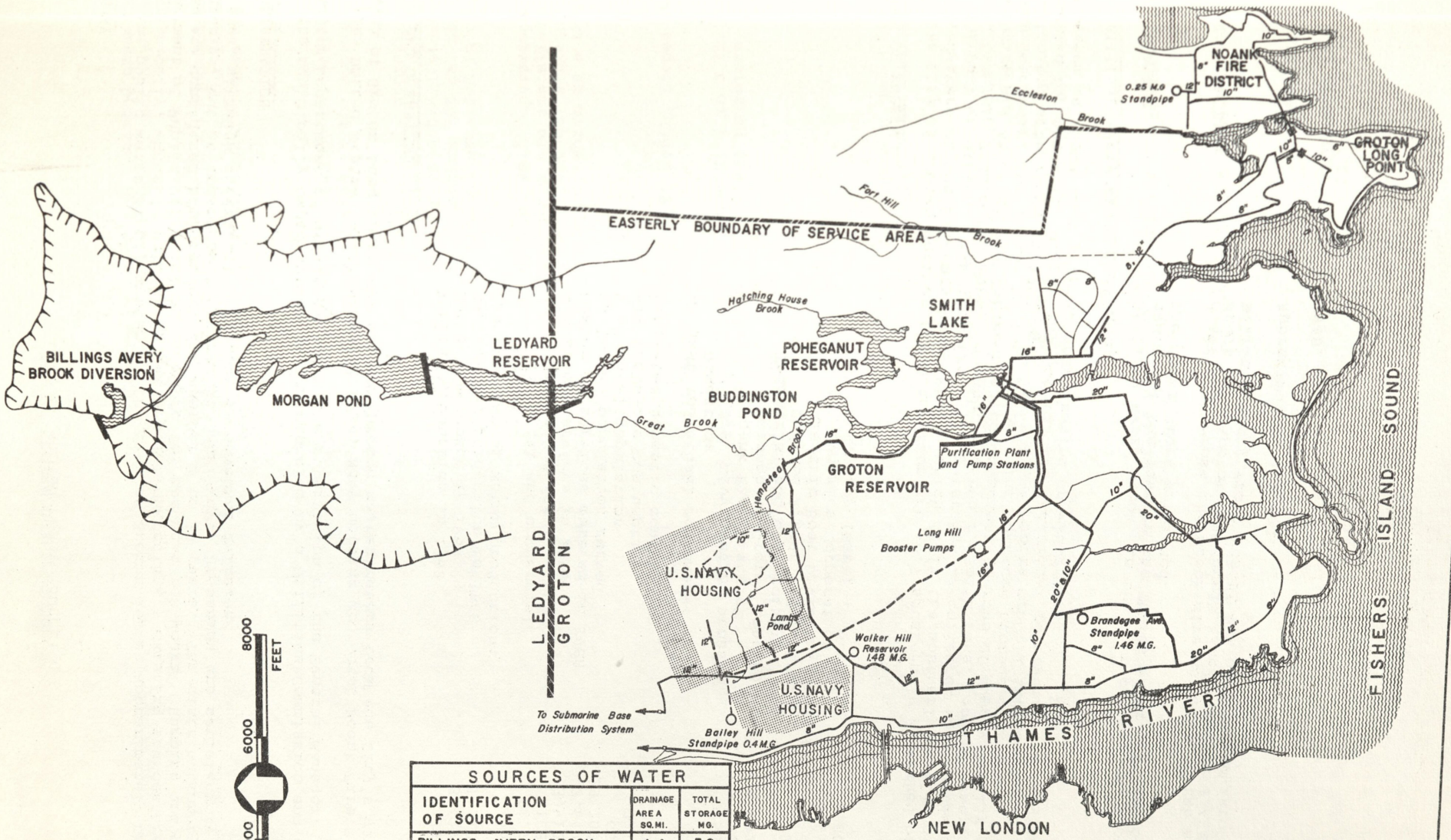
Average production in 1968	9.39 mgd
Total water used in 1968	3.427 bil gal
Maximum day production in 1968	11.12 mgd
Distribution of water production:	
Domestic	22%
Industrial and commercial	66.7%
Unaccounted for	11.3%
Number of services in 1968	3,912
Number of services metered in 1968	3,647
Estimated population served	29,200
% of total population	66
All inclusive consumption	321 gpd/cap
Estimated domestic consumption	70 gpd/cap
Largest individual consumers:	
Domestic:	
U.S. Navy housing areas	0.55 mgd
Noank Fire District	0.094 mgd
Borough of Groton Long Point	0.082 mgd
Industrial and commercial:	
Charles Pfizer & Co., Inc.	4.0 mgd
Electric Boat Division, General Dynamics Corporation	0.81 mgd
U.S. Navy (Base)	1.00 mgd

SOURCE OF SUPPLY

The City of Groton derives its water from the 15.7 square-mile watershed of Great Brook and the headwaters of the Billings Avery Brook, which drain the southerly portion of Ledyard and the central part of Groton. The flow from this watershed is collected in a system of impounding reservoirs, namely: Buddington Pond, Pohegnut Reservoir, Smith Lake, Ledyard Reservoir, and Morgan Pond Reservoir, all of which are interconnected component sources of supply finally discharged into Groton Reservoir, the lowest in the system. The combined storage capacity is 2,242 mil gal, with an estimated safe yield of 12.1 mgd. As the reservoirs are all interconnected, the safe yield is estimated for the total supply and not for the individual reservoirs. A diagram and tabulation of the system is shown on a graphic presentation on Plate No. 7.

Billings Avery Brook Diversion

LOCATION	Billings Avery Brook, in the Town of Ledyard, flows westerly from the center of the Town to the Thames River. It is located just north of the Great Brook watershed.
CONSTRUCTION	A low dam across the brook diverts water to the headwaters of Great Brook by means of a channel. Approximately 1.4 square miles of Billings Avery Brook runoff can be diverted into Morgan Pond.
SAFE YIELD	Approximately 1.1 mgd.
YEAR COMPLETED	1968.

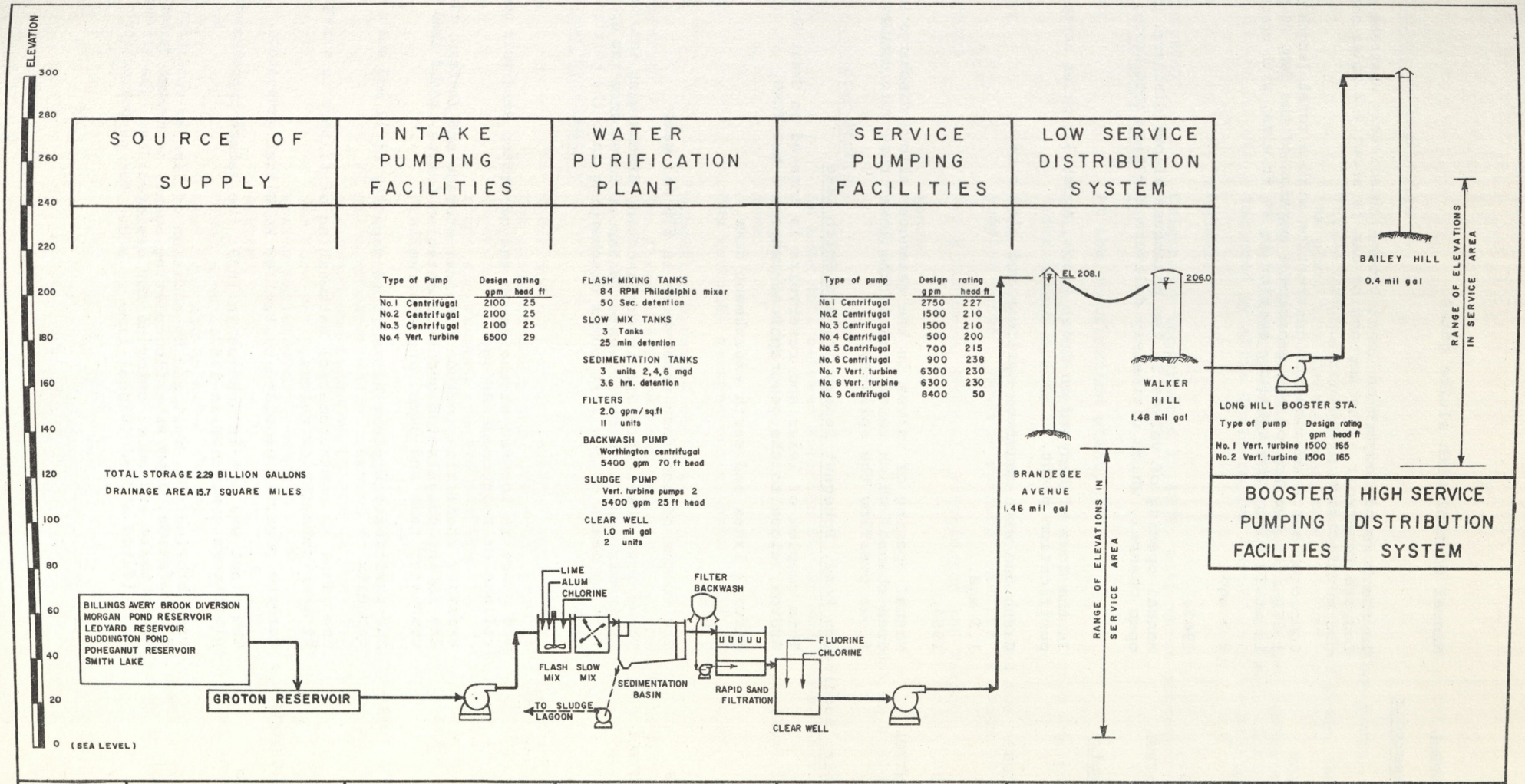


SOURCES OF WATER		
IDENTIFICATION OF SOURCE	DRAINAGE AREA SQ. MI.	TOTAL STORAGE MG.
BILLINGS AVERY BROOK	1.4	50
MORGAN POND	5.2	1188
LEDYARD RESERVOIR		476
POHEGANUT RESERVOIR		223
SMITH LAKE	2.2	79
GROTON RESERVOIR		256
BUDDINGTON POND	6.9	20
TOTAL	15.7	2292
SAFE YIELD OF SYSTEM 12.1 mgd.		

GROTON WATER SUPPLY DIAGRAM

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 7



CAPACITY	TOTAL SAFE YIELD OF SYSTEM 12.1 mgd	RATED CAPACITY 14.0 mgd	RATED CAPACITY 12 mgd MAX. CAPACITY 18 mgd	MAX. CAPACITY 23 mgd	TOTAL STORAGE 2.94 mil gal	MAX. CAPACITY 2.2 mgd	TOTAL STORAGE 0.4 mil gal

GROTON WATER SUPPLY

SCHEMATIC FLOW DIAGRAM

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 8

OPERATION, CONTROL	Manual control with sluice gates.

Morgan Pond Reservoir

LOCATION	In the Town of Ledyard on Great Brook, immediately upstream from Ledyard Reservoir. The impounding dam is about 4.2 miles north of the purification plant.
DAM CONSTRUCTION	Compacted earth embankment construction with a total length of about 1,500 ft. The top of the embankment portion of the dam, 20 ft wide, is at El 135. The spillway section is 40 ft wide, with crest at 126.(
SAFE YIELD	2.5 mgd.
YEAR COMPLETED	1967.
OPERATION, CONTROL	Manual opening of valves in the gatehouse allows discharge into an open channel, which ultimately delivers the flow into Groton Reservoir

Ledyard Reservoir

LOCATION	In the Town of Ledyard on Great Brook, about 3.1 miles north of the purification plant.
DAM CONSTRUCTION	Earth dam with concrete spillway and clay core.
SAFE YIELD	1.5 mgd.
YEAR COMPLETED	1954.
OPERATION, CONTROL	Manual opening of valves in the gatehouse allows discharge into an open channel which terminates in the lower reservoir complex. Flood flows overflow the spillway.

Groton Reservoir, Buddington Pond, Pohegnut Reservoir, and Smith Lake

LOCATION	This complex of lakes and reservoirs is located on Great Brook in Groton, close to the geographical center of the Town.
CONSTRUCTION	Natural lakes and earth embankment dams.
SAFE YIELD	7.0 mgd.
STORAGE VOLUME	The volume of the four reservoirs is 578 mil gal.
OPERATION, CONTROL	These four reservoirs are interconnected, discharging into Groton Reservoir, which is the lowest. Water is taken from the Groton Reservoir by means of low lift pumps discharging into the purification plant.

TREATMENT

LOCATION	The plant is located at the south end of Groton Reservoir near the Village of Poquonnock Bridge.
GENERAL	Existing facilities include chemical storage and feeders, flash mixing basin, coagulation and sedimentation basins, rapid sand filters, washwater tank and pump, and clearwells.
CAPACITY	The purification plant has a rated capacity of 12 mgd and a maximum capacity of 18 mgd.
CONTROL	The plant is semiautomatic; backwashing of filters is accomplished by the operation of valves.
EMERGENCY PROVISIONS	Reserve power is provided by two 100 kw Diesel generators.
YEAR COMPLETED	The plant was put in service in 1939; the latest improvements at the plant were completed in 1962.
TREATMENT	Pre-chlorination, followed by addition of lime to condition water for flocculation, alum as a flocculating agent; activated carbon to eliminate taste and odor; chlorine for disinfection. The effluent is fluoridated and additional lime is added for pH correction.

PUMPING

Low-Lift Pumping Facilities

LOCATION	Adjacent to and northeast of the purification plant.
FUNCTION	Intake pumping station for the purification plant, delivers water to the plant from Groton Reservoir.
CAPACITY	There is one vertical turbine pump and three centrifugal pumps with a total capacity of 12,800 gpm and 25 ft head. Equipment was manufactured by Allis Chalmers and Worthington Corporation.
CONTROL	Manual.
YEAR COMPLETED	Originally constructed in 1938, with three subsequent additions.

High-Lift Pumping Facilities

LOCATION	At the purification plant.
FUNCTION	Deliver purified water from the clearwell into the transmission and distribution system.
CAPACITY	Seven electric motor-driven centrifugal and two vertical turbine pumping units. Maximum pumping capacity is about 23 mgd.
MANUFACTURER	Allis Chalmers, DeLaval, Worthington and Warren.
CONTROL	Manual.
YEAR COMPLETED	Originally constructed in 1937 and additions in stages.

Long Hill Booster Station

LOCATION	On Long Hill between Meridian Street and Wayne Road.
FUNCTION	Supply the high elevation district in the northwest section of the Town.
CAPACITY	Two vertical turbine units, each 1,500 gpm against a 165 ft head.
CONTROL	Automatic pressure control.
YEAR COMPLETED	The first 1,500 gpm unit was installed in 1964 and the second in 1969.
EMERGENCY PROVISIONS	Use of fire engine pump in the event of power outage.

TRANSMISSION AND DISTRIBUTION

GENERAL	There are no main collecting lines before the raw water intake at the purification plant. From the plant six feeder mains extend into many directions more or less radially from southeast progressing clockwise to northwest. One of these feeders is ten in. in diameter, three are sixteen and two are twenty. Since these lines become an integral part of the distribution network within a short distance of the purification plant, all pipes are listed jointly under the above heading. The water transmission and distribution facilities include about 81 miles of water mains, ranging in size from 4 to 20 in. All pipes are owned and operated by the City of Groton. The fire rating association considered the pipe gridiron to be generally satisfactory, although the old unlined cast iron pipe has lost much of its original capacity. There are a number of deadends in the system.
MATERIALS	Older pipe is tar coated cast iron; most new pipe is cement lined cast iron and asbestos cement.
CONDITION OF SYSTEM	The system is in fairly good condition; no serious problems have arisen in the past. Some mains installed prior to 1930 have only

3 ft of cover. More recent installations have 4 ft of cover.

PRESSURES — Discharge pressure at the pumping station varies between 80 and 90 psi. Static pressure in the system is at least 30 psi.

FIRE PROTECTION — There are 349 publicly owned and 22 private fire hydrants. The National Board of Fire Underwriters found that in the City of Groto 5 out of 10 locations were deficient in fire flow. Ratings range from 5C to 10F for the different districts.

VALVES — The average valve spacing in the system is 2,000 ft. The National Board of Fire Underwriters found deficiencies in the valve spacing, particularly in the Poquonnock Bridge district.

INVENTORY OF TRANSMISSION AND DISTRIBUTION PIPES

DIAMETER IN INCHES	LENGTH IN FEET	% OF TOTAL
20	35,664	8.3
16	16,773	3.9
12	55,007	12.9
10	26,244	6.1
8	113,625	26.6
6	129,635	30.3
4	4,742	1.1
3	272	0.1
2 - 2 1/2	9,207	2.2
3/4 - 1 1/2	36,468	8.5
Total	427,637	100.0

DISTRIBUTION STORAGE

Total distribution storage, 3.34 mil gal.

Walker Hill Reservoir (Low Service System)

LOCATION — Walker Hill Road near Grove Avenue.

TYPE — Reinforced concrete reservoir, 90 ft inside diameter.

CAPACITY — 1.48 mil gal.

CONTROL — Single acting altitude valve.

ELEVATIONS — Ground El 175. Overflow El 206.2. Height 31 ft.

YEAR COMPLETED — 1942.

Brandegee Avenue Standpipe (Low Service System)

LOCATION — Brandegee Avenue near Warner Street.

TYPE — Wrought iron standpipe. Inside diameter 60 ft.

CAPACITY — 1.46 mil gal.

CONTROL — Single acting altitude valve.

ELEVATIONS — Ground El 142. Overflow El 208.1. Height 69 ft.

YEAR COMPLETED — 1946.

Bailey Hill Standpipe (High Service System)

LOCATION — Skyview Terrace off Pegasus Drive.

TYPE — Steel standpipe. 32 ft inside diameter.

CAPACITY — 0.4 mil gal.

CONTROL — Double acting altitude valve.

ELEVATIONS	Ground El 230.0. Overflow El 300.0. Height 67 ft.
YEAR COMPLETED	1961.

OPERATION OF SYSTEM

The system is operated by two-stage pumping from the clearwell of the purification plant. During normal day operating conditions pumps deliver water to the system at approximately a 10 mgd rate. The pumps are operated by manual control, with observance of the pressure in the system. Pumps are manually shut when water level in the clearwell drops below a certain minimum. In case peak consumption loads cannot be met from the distribution reservoirs, production rate in the purification plant is increased by higher filter loadings.

Areas above El 100 adjacent to Long Hill Road are served from the booster station, feeding Bailey Hill standpipe.

WATER QUALITY

Samples taken from the distribution system showed the following characteristics:

Color traces and some odor in a few instances.	
Turbidity	0 - 2 units
pH	6.9 - 7.2
Other characteristics were well within standards.	
The supply is fluoridated.	

SERVICE RATES AND CHARGES

MINIMUM CHARGE PER YEAR	5/8 in. connection	$5.50
	2 in. connection	$42.00
	6 in. connection	$262.00

Semi-yearly billing.
Step rate system 60¢ to 33¢ per 1,000 gal.

MAINTENANCE PROGRAMS

Hydrant inspection and flow tests biennially. Meter repairing and inspection (699 repairs during 1968). Leakage survey completed in 1966. Line flushing and hydrant inspection. Valve inspection. Watershed supervision by a full-time supervisor.

FUTURE PLANNING

Recommendations were made by the consulting engineers to construct the following improvements:

1. Purification plant: minor technical improvements and installation of new chlorinators, all of which already have been completed.

2. Low-service distribution system: construction of new mains, extension of existing ones and cleaning and cement lining of some of the older deteriorated pipes.
High-service distribution system: construction of new mains, installation of a new pumping station, construction of a new 1.0 mil gal standpipe.

ENGINEERING STUDIES AND REFERENCES

Sanitary Survey, Groton, Connecticut, Water System. Joint survey conducted by Connecticut State Department of Health and Region I HEW of U.S. Government, Boston, Massachusetts, September, 1966.

Report to City of Groton, Connecticut, Department of Utilities Upon Additions and Improvements to Water Supply System. Metcalf & Eddy, September, 1965.

EASTERN WATER COMPANY

GENERAL

The Eastern Water Company serves the Bel Aire subdivision of Groton. The principal officers of the corporation are Samuel M. Sisisky and Renald A. Grenier. The offices are located on Kingswood Drive in North Stonington.

The subdivision is located to the north and south of Route 1, between Fort Hill and Eccleston Brook. The topography of the area is relatively flat on the south side of Route 1 and hilly on the north side, with elevations ranging from 40 ft to 150 ft.

There are presently 200 residences, each of which is valued at more than $20,000, one school (Cutler Junior High) and one garage. Ultimate services are planned for 225 residences and a 150 unit apartment complex. All services are metered. Estimated daily consumption is 51,000 gal, or 75 gpd/cap. The system was put in operation in 1959.

SOURCE OF SUPPLY

DESCRIPTION

The wells and pumphouses are located on Fishtown Road about 3/8 mile south of Route 1, just before Cutler Junior High School. There are two wells: No. 1 is located at the pumphouse and No. 2 about 130 ft from the pumphouse.

Gravel packed Well No. 1: Diameter: 10 in. Depth: 42.5 ft.
Gravel packed Well No. 2: Diameter: 8 in. Depth: 39 ft.

WELL PUMPING

The capacity of the primary well is rated as 150 gpm and Well No. 2 as 100 gpm. The primary well is equipped with a Deming 1,750 rpm vertical turbine pump drived by a 15 hp motor. Well No. 2 is pumped by a submersible pump.

REMARKS

Presently the two pumps are wired to operate together with a 45 sec delay. The primary well was shut down during 1969 and purged while Well No. 2 supplied the entire demand. The pump house is a concrete block structure with a sump and sump pump.

EMERGENCY

There is a tee installed on the line to accommodate a gasoline engine driven pump, which is in storage at another site.

TREATMENT

DESCRIPTION

The supply is chlorinated. Chlorine solution is injected at the base of the screen, with a Wallace and Tiernan hypochlorinator from a plastic barrel. No other treatment is applied.

TRANSMISSION AND DISTRIBUTION

GENERAL

The distribution system consists of cement lined cast iron pipes, with 8 in. mains along the main streets and 6 in. lines on the side streets. All services are metered, but no output meter is installed. With the exception of two dead end streets, all lines are looped and valves are installed at each intersection.

MATERIALS AND LENGTHS

6 in. cast iron	10,387 ft
8 in. cast iron	3,686 ft
Total length	14,073 ft or 2.7 miles

PRESSURES

The discharge pressure is between 84 and 98 psi in order to provide a minimum of 25 psi at the highest elevations. One-half of the services are equipped with pressure reducing valves.

FIRE PROTECTION

There are seven hydrants, not in service except for flushing and flooding a local skating rink.

STORAGE FACILITIES

DESCRIPTION

One steel pneumatic 10,000 gal capacity storage tank is partially housed in the primary pumphouse. The tank operates on pressure switches, with a small air compressor supplementing the pressure.

The developer is planning to add more storage volume to the system.

WATER QUALITY

No gross undesirable physical or chemical constituents were noted on the samples taken for complete analysis, although the sodium content was 19 mg/l. The low pH of 5.9 shows a very corrosive tendency.

Occasional musty odor was noticed and there were limited nitrogen constituents.

WATER RATES

Basic quarterly 5/8 in. service is $6.50, including the first 4,000 gal. Then a step rate system from 80¢ to 50¢ per 1,000 gal is applied.

MAINTENANCE

The system is operated by a part-time employee of the developer. Routine checking and minor repair and customer service is also accomplished by this person. Major repairs are contracted.

REMARKS

A well exploration program was undertaken by the developer one-half mile east of the present wells. Two test wells of 80 gpm were located. The developer is in the process of deeding nine acres of land, including these sites, to the Town of Groton as a recreational area; the deed calls for preserving the right of water development and restricting waste disposal on this property.

It is reported by the State Health Department that the 200 ft minimum land ownership easement at the well sites has yet to be obtained.

FAIR ACRES MOBILE PARK

Fair Acres Mobile Park is located on the west side of Route 27 approximately 2,000 ft north of Interstate Route 95. The area is flat, at El 30. The area is approximately 10 acres, with 80 mobile home spaces. Estimated population is 250, and estimated daily water consumption is 15,000 gal. There are no meters in the system.

The source of supply is two drilled wells. Well No. 1 is housed in a 6 ft by 10 ft concrete block pit; a submersible pump discharges water into a 1,000 gal pressure tank. Well No. 2 is approximately 50 ft from the owner's house and discharges into another 1,000 gal pressure tank located in the basement of the house. There is neither an emergency power source, meters, nor any kind of treatment. The present supply is barely adequate, with restrictions practiced intermittently.

The distribution system consists of plastic pipes ranging in size from 3 to 1 1/2 in. The lines are single lines with no valves or interconnections. Pressures range between 25 and 45 psi. Water service charges are included in the space rental.

Mystic Valley Water Company mains were recently installed adjacent to this park.

FIRE DISTRICT OF PAWCATUCK

GENERAL

The Fire District of Pawcatuck is supplied with water by the Water Division of the Department of Public Works of the Town of Westerly, Rhode Island. The entire system is owned and operated by that municipality. The system originated prior to 1900.

The service area extends over approximately one square mile covering the area west of Pawcatuck River at equal distances north and south of the intersection of Routes 1 and 2.

The topography of the area is rather hilly, elevations ranging from 10 ft at the river to 212 ft at the highest point where the reservoir is located.

The present estimated population of the Fire District is 5,022 of which approximately 90 percent is served by the public water supply.

According to Westerly statistics, the average per capita consumption in the system was 101 gpd. On this basis average daily consumption in Pawcatuck was 475,000 gal. There were 1,684 services, all metered. Pawcatuck constitutes approximately 20 to 25% of the entire Water Division activity.

SOURCE OF SUPPLY

DESCRIPTION

The source of supply is two well fields, with 65 and 85 wells, respectively, plus one gravel packed well and one smaller well elsewhere. All the wells are located north of Westerly along the east bank of the Pawcatuck River.

TREATMENT

The supply is chlorinated.

PUMPING

DESCRIPTION — There is a large-capacity pump station at each well location. The pumps deliver water into the system reservoirs and mains.

TRANSMISSION AND DISTRIBUTION

GENERAL — The Pawcatuck section is served through three crossings of the river from Westerly. Most lines are looped, although a single main line extends to the western end of the system.

MATERIALS AND LENGTH — Pipe materials are cast iron and asbestos cement, in sizes from 2 in to 16 in. The service connections are of lead, copper, iron and plastic. The total length of mains in Pawcatuck was reported as 22.09 miles. Gate valves, located at each intersection, number 256 in Pawcatuck.

PRESSURES — Overflow level in the Hinkley Hill Reservoir is 231 ft. Pressures in the system may rise to 110 psi due to intensive pumping. Lowest tested pressure was 30 psi.

FIRE PROTECTION — There are 89 hydrants owned by the public utility and 28 privately owned.

STORAGE FACILITIES

GENERAL — There is one reservoir located in Pawcatuck. The Fire District also benefits from the storage facilities located in Westerly.

LOCATION — On Hinkley Hill at the western end of the Fire District.

CAPACITY AND TYPE — Prestressed concrete underground type having a capacity of 1 mil gal

CONTROL — A double acting altitude valve is installed.

OPERATION OF SYSTEM

DESCRIPTION — This is a pumped system, with the storage tanks floating on the network. All operational facilities are located in Westerly.

WATER RATES

Minimum charge per half year is $9.50, including 18,000 gal. Additional charges on a step rate system are from 61¢ per 1,000 gal to 37¢ per 1,000 gal.

LANTERN HILL DEVELOPMENT WATER SUPPLY

The water utility serving the subdivision known as Lantern Hill is owned and operated by Arthur E. Burgess. The service area is located in Stonington on the east side of Lantern Hill Road, approximately 1/2 mile north of Route 184. The development is across from the new Mystic Valley Water Company well and treatment plant.

The area is hilly, sloping from El 150 to El 60 at the road level. There are 17 houses connected to the utility and plans call for an additional 3 homes. Present estimated population is 60, and average daily water consumption is 3,500 gal.

The source of supply is an 8 in. diameter, 19 ft deep, gravel packed well. A 78 gpm horizontal centrifugal pump is installed in a 12 ft by 12 ft masonry building above the well. This structure houses a pressure filter and the well pump, and partially imbedded into the wall is a 5,000 gal pressure tank. It is a hydropneumatic system with pressure switches set at 60 and 75 psi. The "Bruner" zeolite filter was installed to remove iron and manganese and soften the water. The supply is fluoridated with a small diaphragm feeder, and chlorinated with a hypochlorinator.

The distribution system consists of approximately 2,000 ft of 6 in. asbestos cement pipe. The water main is a single line with 3/4 in. copper connections. The monthly water rate is $5. The

system was installed by Aetna Engineering. The owner is presently negotiating to sell the system to the Mystic Valley Water Company.

LORD'S POINT ASSOCIATION

GENERAL

The public water supply system serving the Lord's Point area is owned and operated by a home-owner's association. It is a seasonal supply, opening in the spring and closing in November. The service area covers the peninsula extending northward to the right-of-way of the Penn Central Railroad.

Elevations range from sea level to about 25 ft. The area is rocky; large blocks of ledge rise from the water. There are 158 services and the average population is estimated at 500. During summer weekends, however, this may be considerably higher. Estimated daily water consumption is 25,000 gal.

SOURCE OF SUPPLY

DESCRIPTION — The source of supply consists of two drilled wells.

Well No. 1: diameter: 8 in. depth: 75 ft.
Well No. 2: diameter: 6 in. depth: 93 ft.

WELL PUMPING — Only Well No. 1 is used to supply the system. A 50 gpm horizontal centrifugal pump is installed, driven by a 7 hp electric motor. There is an 8 hp standby motor, but no emergency power source.

REMARKS — The pumps and storage tank are housed in a 10 ft by 52 ft frame building. A small air compressor is also installed, and materials are stored in the structure.

TREATMENT

The supply is untreated.

TRANSMISSION AND DISTRIBUTION

GENERAL — The system consists of mostly 2 in. diameter pipes, laid with only 6 to 8 in. cover. For this reason, frequent breaks occur. Originally all pipes were galvanized iron; recently they began replacing them with plastic pipes. Valves are located at each intersection. It is reported that there are some connections to individual supplies.

MATERIALS AND LENGTHS

3 in. galvanized iron and plastic pipe	700 ft
2 in. galvanized iron and plastic pipe	6,100 ft
1 in. plastic and copper pipe	550 ft
Total length	7,350 ft

PRESSURES — Pressures range from 45 to 70 psi, being lower at peak consumption periods.

STORAGE FACILITIES

LOCATION — In pumphouse, completely indoors.

CAPACITY AND TYPE — 14,000 gal pressure tank.

CONTROL — Pressure switches set at 45 and 70 psi.

OPERATION OF SYSTEM

DESCRIPTION — This is an automatic hydropneumatic system. The pump in Well No. 1 is controlled by a pressure switch. A small air compressor maintains a volume of air in the pressure tank. Well No. 2 is not connected to the system; it has a positive displacement hand pump.

WATER QUALITY

Samples taken by the State Health Department showed high sodium content, hard water and high chloride concentration. The Health Department recommended that the management advise any consumers on a salt-free diet to refrain from drinking the water. It was found to be bacteriologically safe for drinking purposes.

WATER RATES

Water is charged for the season on the basis of a fixture count. Average seasonal charges are approximately $15.

MAINTENANCE

The system is maintained by one of the permanent residents on a part-time basis. Minor repair work is also accomplished by him.

MYSTIC VALLEY WATER COMPANY

GENERAL

The Mystic Valley Water Company is a local subsidiary of the New England Water Service Corporation. The normal operations of the company are directed by the local manager. The company service parts of the towns of Groton and Stonington, as shown on Plate No. 9. The system originated in the late 1800's. The service area is somewhat hilly, ranging from sea level to approximately El 250.

Total population served is estimated at 11,500 of which 7,500 reside in the Village of Mystic and 4,000 in the Village of Stonington.

PLANT OPERATING DATA

Average production in 1968	1,020,000 gpd
Total water used in 1968	370.5 mil gal
Maximum day production	1.82 mgd
Date of occurrence of maximum production, July 12, 1969	
Distribution of water consumption:	
Domestic	47%
Commercial and industrial	30%
Unaccounted for	23%
Number of services in 1968	2,912
Number of services metered	2,730
Estimated population served	11,500
All inclusive consumption	89 gpd/cap
Estimated domestic consumption	42 gpd/cap

Largest individual consumers:

	Name	Consumption
1.	American Velvet Company	160,000 gpd
2.	Sonoco Products	20,000 gpd
3.	Electric Boat	12,000 gpd
4.	Mystic Motor Inn	13,000 gpd
5.	Durham Corporation	10,000 gpd
6.	Monsanto	10,000 gpd
7.	Puritan Laundry	10,000 gpd

The ratio of maximum month consumption to average month consumption during 1968 was 1.43.

SOURCE OF SUPPLY

DESCRIPTION

The Mystic Valley Water Company derives its water from two interconnected reservoirs, Palmer Pond and Dean's Pond. A large gravel packed well at Lantern Hill is nearly ready to be tied into the system. There is also an emergency source, Copp's well, which may be pumped to supplement the yield of Dean's Pond. Of the two reservoirs, Dean's Pond is at the higher elevation; it discharges into Palmer Pond. The two reservoirs collect water from one watershed and technically they operate as one unit; thus they are discussed jointly.

Dean's and Palmer Ponds

LOCATION

The two reservoirs are located on Copps Brook, approximately half way

between Mystic and the Village of Stonington and about two miles north of the shore line.

CONSTRUCTION — Palmer Pond is a concrete gravity dam and spillway with flash boards on the spillway to raise the water level by 10 in. to 45 ft. Dean's Pond is an earthen dam with rock protection on the surface.

STORAGE AND YIELD — The two reservoirs have a combined watershed of 6 square miles, a combined storage of 115 mil gal and a safe yield of 1.0 mgd. Of the total storage, Dean's Pond has a capacity of 35 mil gal and Palmer Pond, 80 mil gal.

YEAR COMPLETED — The Palmer dam was built in 1880; it was raised in 1938. During 1958 it was gunited.

OPERATION, CONTROL — The spillway of Dean's Pond is at El 52.5 ft; it overflows to Palmer Pond, where the spillway is at El 45.0 ft. Most of the year water overflows the spillway into Copps Brook and the Sound. A gate chamber with a removable screen and a pipe intake to the treatment plant is at the upstream side of Palmer Pond. Manual opening of the gate allows gravity discharge into the purification plant.

Copp's Well

LOCATION — Approximately 2,000 ft above Dean's Pond, along Copps Brook.

DESCRIPTION — 24 in. diameter, 45 ft deep, gravel packed well. Estimated yield 410,000 gpd.

WELL PUMPING — A gasoline driven turbine pump having a capacity of 300 gpm at 50 ft discharge head.

REMARKS — This is an emergency supply; when used it pumps directly to Copps Brook which in turn discharges into Dean's Pond. It was installed and used during the 1965 drought.

CONTROL — Controlled by manual operation locally.

Lantern Hill Well

LOCATION — In the Town of Stonington on the west side of Lantern Hill Road, approximately 1,000 ft north of Route 184.

DESCRIPTION — 24 in. by 18 in. 75 ft deep well; estimated safe yield 1.0 mgd.

WELL PUMPING — 60 hp electric motor driven Byron-Jackson deep well turbine pump, having a rated capacity of 700 gpm at 240 ft discharge head.

REMARKS — The well pump was not yet in service at the date of this report due to unfinished construction of the treatment plant. The well is housed in a 10 ft by 16 ft masonry structure.

EMERGENCY — Standby power is provided by a propane gas powered engine.

CONTROL — Controlled by telemeter.

TREATMENT

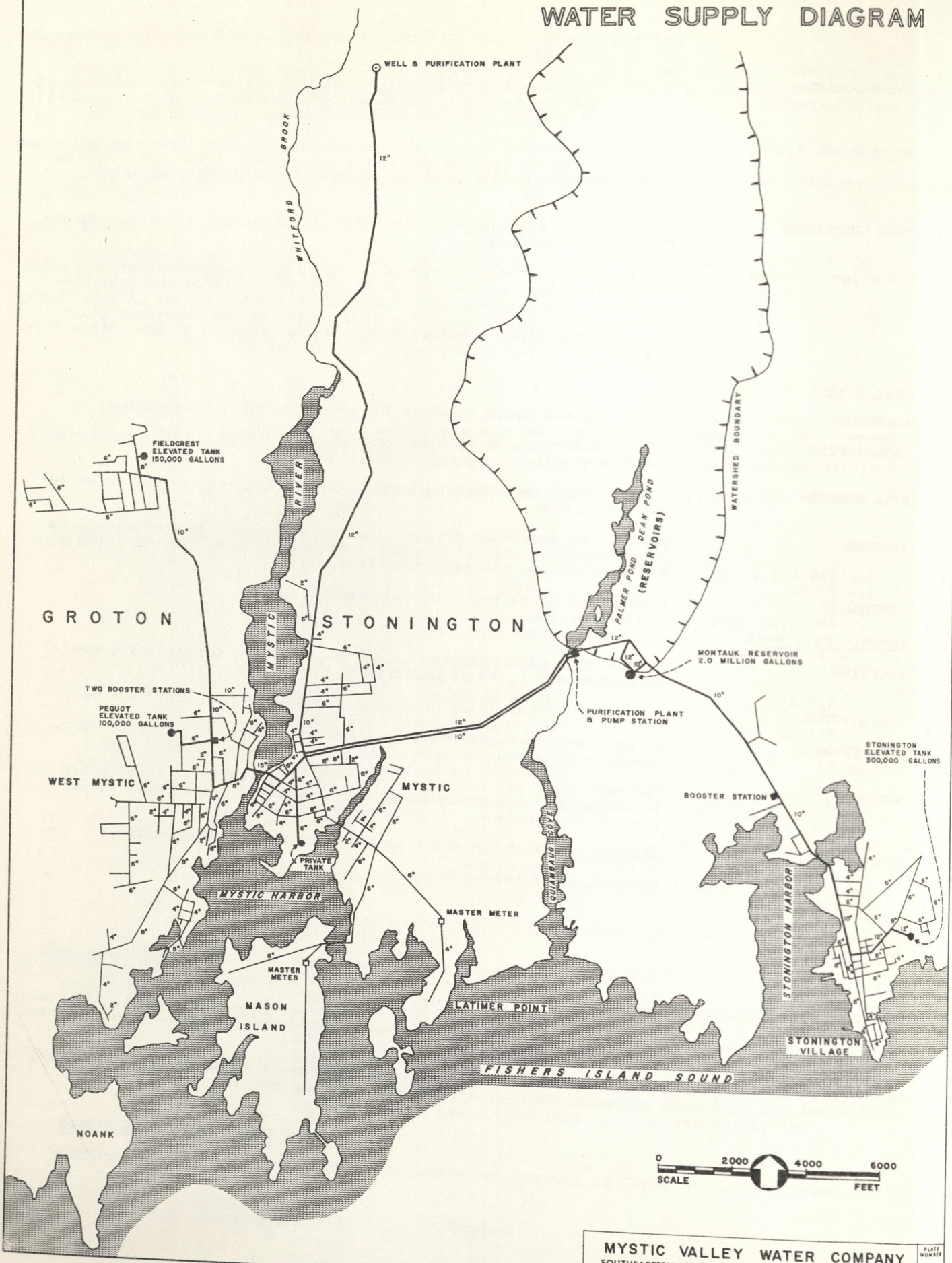
Main Plant

LOCATION — The plant is located at the south side of Palmer Pond, immediately below the concrete dam.

GENERAL — Existing facilities include chemical storage and feeders, flash mixing basin, sedimentation basins, rapid sand filters, clearwells and washwater pumps.

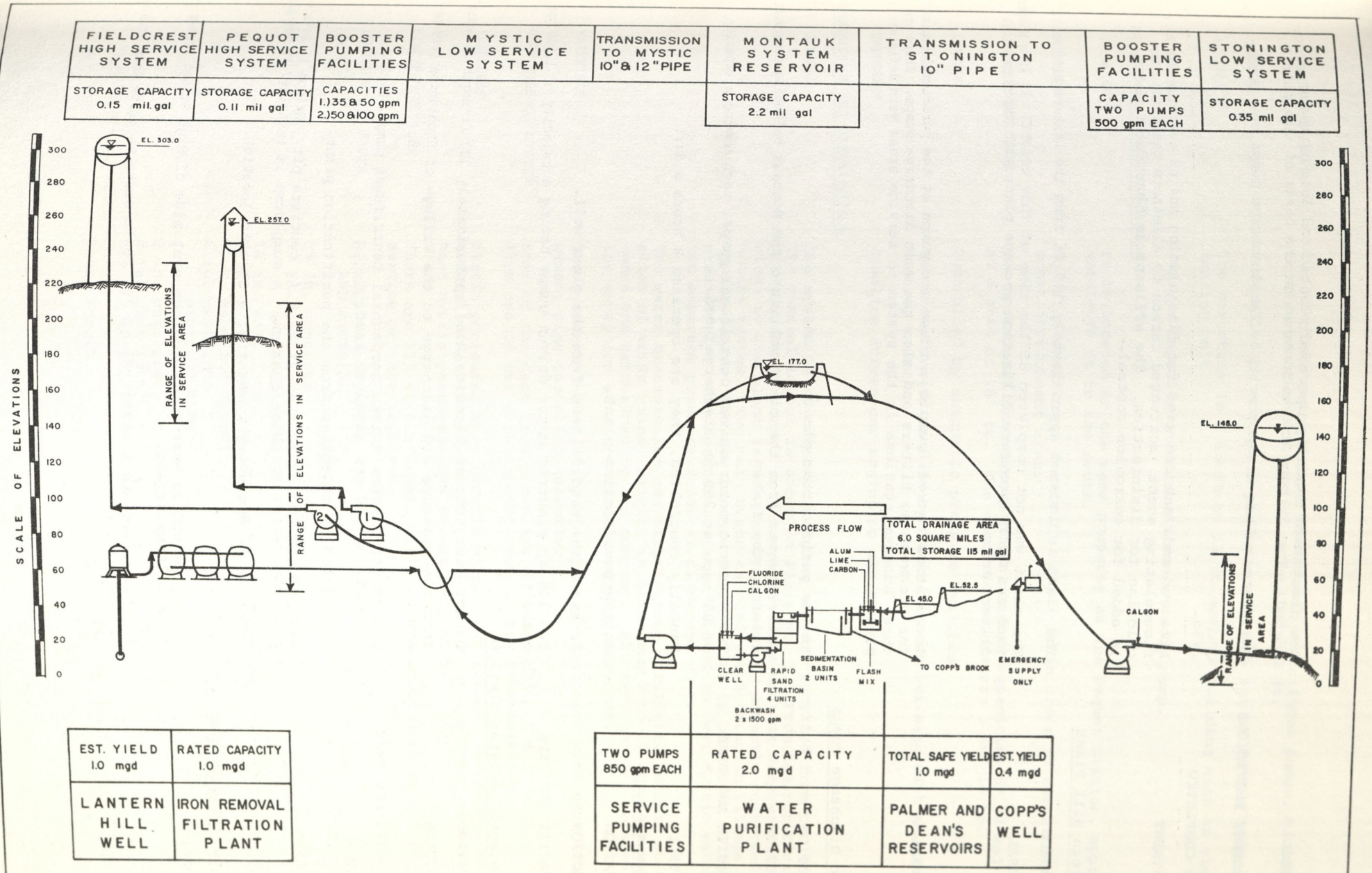
CAPACITY — The purification plant was designed for a capacity of 2.0 mgd at a filtering rate of approximately 2.0 gpm/sq ft.

WATER SUPPLY DIAGRAM



MYSTIC VALLEY WATER COMPANY
SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 9



MYSTIC - STONINGTON WATER SUPPLY

SCHEMATIC FLOW DIAGRAM
SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 10

CONTROL	The plant is a manually operated plant; head loss gages are not connected. The filters are backwashed on the basis of time schedule.
EMERGENCY PROVISIONS	The process flow is by gravity. The discharge pumps have standby power.
YEAR COMPLETED	1935.
TREATMENT	Lime and soda ash are used for flocculation and pH control, alum as a flocculating agent, activated carbon to eliminate taste and odor, chlorine for disinfection. The effluent is fluoridated, and calgon is added for corrosion control.

Lantern Hill Plant

LOCATION	The plant is located approximately 100 ft from the Lantern Hill Well.
GENERAL	The plant was not completed at the time of this report. It is a Hungford and Terry pressure filtration package plant with three parallel filter units.

PUMPING

GENERAL	In addition to well pumping, there are pumps at the purification plant for backwashing filters and also the main discharge pumps. There are three booster stations in the system to service areas with deficient pressures.

Main Discharge Pumps

LOCATION	In the purification plant.
FUNCTION	Deliver water from the clear well into the Montauk balancing reservoir and into the system.
CAPACITY AND TYPE	Two electric motor driven centrifugal pumps, each having a capacity of 850 gpm at 200 ft discharge head.
CONTROL	Manually controlled, they are operated 8 hours a day.

Backwash Pumps

LOCATION	In the purification plant.
FUNCTION	Backwash the sand filters from the clear well.
CAPACITY AND TYPE	Two 100 hp electric motor driven pumps having a capacity of 1,500 gpm each.

Stonington Booster Station

LOCATION	On the east side of Flanders Road approximately 200 ft north of Route
FUNCTION	Increase pressure and discharge to the Village of Stonington service area.
CAPACITY AND TYPE	Two electric motor driven horizontal centrifugal pumps, having a capacity of 500 gpm at 60 ft head.
CONTROL	Controlled by telemeter from the purification plant.
REMARKS	The pump is housed in a 10 ft by 8 ft concrete pit. Calgon is injected into the system at this location. A sump pump is installed in the pit
EMERGENCY	There is no emergency power source at this location.

Pequot Booster Station

LOCATION	It is located in West Mystic on the east side of High Street across from Godfrey Street.
FUNCTION	To raise water to a static El of 257 ft in order to serve this area of the town.

CAPACITY AND TYPE — Two electric motor driven horizontal centrifugal pumps, having capacities of 35 and 50 gpm at a head of 110 ft.

CONTROL — Controlled by automatic pressure switches set at 68 and 78 psi.

REMARKS — The structure is a 15 ft by 12 ft masonry building with an electric heating unit.

EMERGENCY — 400 gpm capacity gasoline driven standby pump.

Fieldcrest Booster Station

LOCATION — It is located on the same property as the Pequot Station, approximately 20 ft to the south.

FUNCTION — To raise water to a static El of 303 ft in order to serve the Fieldcrest development area.

CAPACITY AND TYPE — Two horizontal centrifugal pumps, having capacities of 50 and 100 gpm at a head of 163 ft. The electric motors are 5 and 10 hp.

CONTROL — Controlled by automatic pressure switches.

REMARKS — The structure is an 8 ft by 10 ft masonry building with an electric heating unit.

EMERGENCY — Gasoline driven car engine on standby.

TRANSMISSION AND DISTRIBUTION

GENERAL — The system is an extended complex network supplied from two sources. The general layout is shown on Plate No. 9. From the purification plant water is pumped to the system. The Montauk Reservoir located close to the plant is a balancing reservoir directly connected to the entire system. Two main branches feed the Stonington Village and Mystic areas. The new Lantern Hill Station is connected to the Mystic area supply. Two booster stations located in West Mystic establish two separate pressure zones as discussed above.

The water transmission and distribution facilities include about 56 miles of water mains, ranging in size from 2 to 15 in. All pipes are owned and maintained by the company. All services are metered, with the exception of a few fire protection services.

MATERIALS — The overwhelming majority of pipes are cast iron with some asbestos cement pipe installed recently.

CONDITION OF SYSTEM — Some of the cast iron pipes are 80 years old. A 6 in. tap drilled from one of the pipes showed very little tuberculation.

PRESSURES — Static pressures vary greatly within the system. Pressures range generally between 30 and 70 psi. Throughout the lower elevations in West Mystic pressures are excessively high.

FIRE PROTECTION — There are 219 fire hydrants serving the municipalities and 20 hydrants serving private industry.

INVENTORY OF PIPES

DIAMETER IN INCHES AND MATERIAL	LENGTH IN FEET	% OF TOTAL
15 in. concrete	517	0.2
12 in. cast iron	26,557	9.0
asbestos cement	11,626	4.0
10 in. cast iron	32,033	10.9
8 in. cast iron	38,326	13.0
asbestos cement	1,298	0.4
6 in. cast iron	114,895	38.9
asbestos cement	10,758	3.6
4 in. cast iron	34,057	11.5
3 in. cast iron	5,322	1.8
2 in. cast iron	12,638	4.3
3/4 in. to 1 1/2 in. Misc.	7,033	2.4
Total length	295,060 (56 miles)	100.0%

DISTRIBUTION STORAGE

Total distribution storage, 2.81 mil gal.

Montauk Reservoir

LOCATION	In the Town of Stonington, east of Montauk Road, approximately 1,00 ft south of Jerry Browne Road.
TYPE	Open circular earth embankment reservoir with clay bottom and field stone sides.
CAPACITY	Approximately 2.2 mil gal.
CONTROL	Controlled by telemeter from purification plant.
ELEVATIONS	Overflow El 177 ft.
YEAR COMPLETED	1935.

Stonington Reservoir

LOCATION	In the Village of Stonington just north of the Penn Central Railroad right-of-way.
TYPE	Steel covered elevated tank.
CAPACITY	350,000 gal.
CONTROL	Single acting altitude valve.
ELEVATIONS	Overflow El 145 ft.
YEAR COMPLETED	1956.

Fieldcrest Reservoir

LOCATION	In the Town of Groton in Fieldcrest Estates, off Nantucket Drive.
TYPE	Steel covered elevated tank.
CAPACITY	150,000 gal.
CONTROL	Double acting altitude valve.
ELEVATIONS	Overflow El 303 ft.
YEAR COMPLETED	1959.

Pequot Reservoir

LOCATION	In West Mystic at the west side of Pequot Avenue.
TYPE	Steel covered elevated tank.
CAPACITY	110,000 gal.
CONTROL	Pressure control to the booster pump.
ELEVATIONS	Overflow El 257 ft.
YEAR COMPLETED	1928.

OPERATION OF SYSTEM

The entire system is operated from the central purification plant. The booster stations presently operate on pressure control; however, telemetering equipment has already been installed. The new Lantern Hill Station will be completely automated and operated from the central plant.

WATER QUALITY

GENERAL

Samples collected by the State Health Department showed coliform coun from the untreated samples, but it was bacteriologically acceptable

water after treatment. The chemical and physical characteristics of the water were found to be good.

SERVICE RATES AND CHARGES

Minimum charge per year including 9,000 gal quarterly is $33.60 for 3/4 in. services. Additional rate per 1,000 gal is 94¢. Larger services are charged at a higher rate according to the size of the connection.

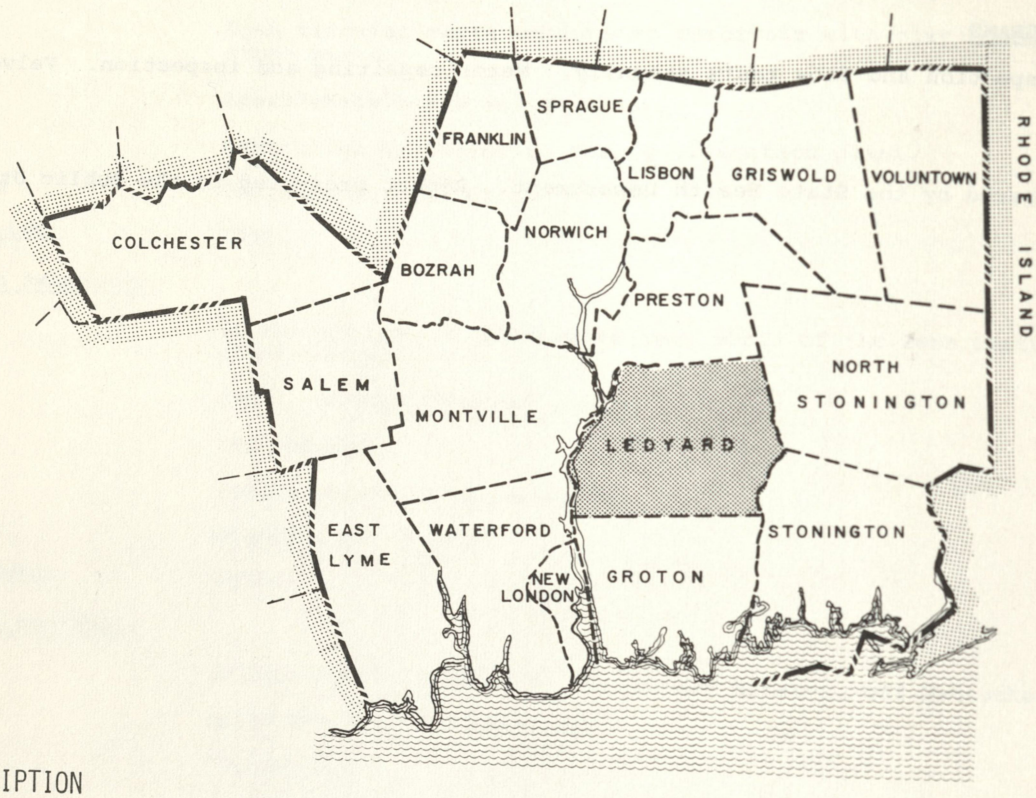
MAINTENANCE PROGRAMS

Hydrant inspection and flow tests annually. Meter repairing and inspection. Valve inspection intermittently.

REFERENCES

Report prepared by the State Health Department. Report presented to the Public Utilities Commission.

LEDYARD



GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Ledyard is located near the center of the Region on the east bank of the Thames River. It comprises 40.7 square miles of rolling hills and narrow stream valleys. Elevations are at sea level along the River and about 400 feet on the highest hills. The average relief between hilltops and valley floors is about 200 feet.

TRANSPORTATION

Freight service is available from various trucking concerns. One local industry is also served by ocean tankers and the New Haven Railroad. Although no expressways pass through Ledyard, the town contains portions of State Routes 12, 2, 117, and 214.

INSTITUTIONS AND INDUSTRY

Ledyard has no major institutions and few industries. Industrial products include plastics, chemicals, and concrete. A major commercial center has developed in Gales Ferry which serves all of Ledyard and portions of neighboring towns.

GOVERNMENT

Ledyard has a selectmen-town meeting-board of finance form of government.

POPULATION

The population has grown since 1960 from 5,395 to an estimated 10,600 persons. This represents the most rapid rate of growth in the Region. Two areas of settlement have occurred in the town, each separated from the other by the Groton reservoir system which extends north and south through most of the town. The western settlement has developed in a broad arc, centering on Gales Ferry, while the eastern settlement is a series of subdivisions within a two-mile radius of the local high school.

WATER SYSTEMS

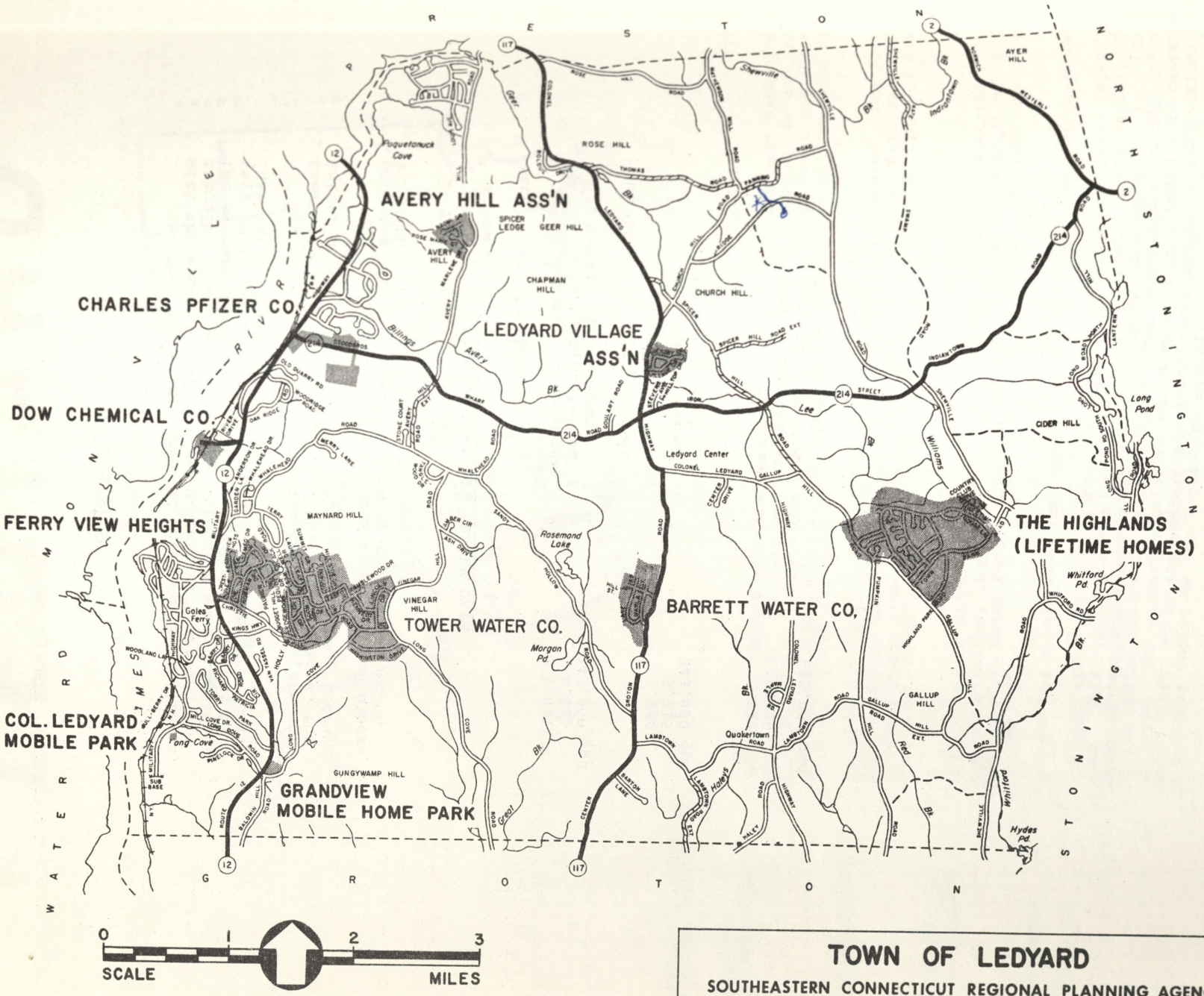
The Town of Ledyard owns no water works facilities, with the exception of the individual wells serving the schools. There are four investor-owned water companies, two systems owned by homeowners' associations, and four very small systems serving mobile parks and commercial-institutional systems.

Two industrial concerns, Dow Chemical Company and Charles Pfizer and Company have their own systems, the latter of which also serves limited residential users.

The location of these various companies and other concerns and the areas serviced by them are shown on Plate No. 11.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	1,041
Population served	4,685
Average output	345,000 gpd
Individual Wells - Domestic	
Number of wells	1,680
Population served	5,715
Average output	343,000 gpd
TOTAL	
Number of Consumers	2,721
Population served	10,400
Industries served	2
Average output	688,000 gpd



TOWN OF LEDYARD

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 11

AVERY HILL ASSOCIATION - MOBILE COURT

GENERAL

The Avery Hill Association is a subdivision which was initiated by Hildreth E. Barrett in 1958. It consists of 54 lots, approximately 1/3 acre in size. There are 43 lots held by private individuals and an additional 11 lots are held by Mrs. Hildreth Barrett. The subdivision is located in the Town of Ledyard on the west side of Avery Hill Road north of Holmburg Hill.

The topography of the area is flat on both sides of a small brook and slightly sloping in the rest of the area. The small brook flowing parallel with the main highway is in a depression, and the well is located on the east bank of this brook.

There are 43 services connected to this system and the estimated population served is 125. There are no meters in the system; the annual total output is reliably estimated as 8,300 gallons per day or 66 gpd/cap.

SOURCE OF SUPPLY

DESCRIPTION

The source of supply consists of one 6 in. diameter 18 ft deep drilled well. The well output is approximately 120 gpm. The well is located on the east bank of the brook.

WELL PUMPING

Two Deming three stage vertical centrifugal pumps are installed. The larger pump has a 2 hp motor. The other pump is somewhat smaller. Both pumps draw on the same well. Control is by means of automatic pressure switch set "on-off" for 45 to 52 psi on one pump and 52 to 60 psi on the other pump.

REMARKS

The well discharge pH value is usually around 5.8-6.2 but at times of rainfall it suddenly drops a full point indicating possible surface flow into the well. As a matter of fact, the rate of chemical feed to adjust the pH is based on a rain gauge. Individual leaching fields may contaminate the small brook.

The pump and other equipment is housed in a plywood and tar shingle shed approximately 10 x 15 ft in size.

TREATMENT

Soda ash (Na_2CO_3) is added to adjust pH values to approximately 7.0 and chlorine is injected to the discharge pipe with a hypochlorinator. Soda ash is dissolved in a plastic barrel and fed with a diaphragm pump.

TRANSMISSION AND DISTRIBUTION

GENERAL

The system consists of four individual lines of plastic pipes ranging in size from 1 in. to 2 1/2 in. The individual lines approximately 800 ft in length are not interconnected - only at the pumphouse. Total length of pipes is approximately 3,000 ft. There are no meters in the system. Most of the fittings are cast iron, with consequent jointing problems.

PRESSURES

Pressures range from 20 to 60 psi.

STORAGE FACILITIES

DESCRIPTION

There is one 1,070 gallon steel storage tank in the shed. A small air compressor is connected to the tank. Operation is automatic based on pressure switches.

OPERATION OF SYSTEM

The system operates automatically on set pressures as described above. The well pumps deliver water to the tank and into the system. Chemical feed pumps are connected to the pump switches and also work automatically. At times of rainfall when water level rises in a tank connected to the roof gutter, the rate of soda ash feeding is automatically doubled to account for the drop in the pH value.

WATER QUALITY

Samples were never tested in a State Laboratory; occasionally samples were taken to the Sub marine Base for laboratory testing. Without treatment the pH drops to 5.0. A residual chlorine content of 0.2 ppm is maintained.

WATER RATES

A flat rate of $5 per month is charged and billed every two months.

MAINTENANCE

The president of the Association performs the maintenance and also supervises repairs. Bre are fixed by the residents providing the labor; larger repairs are contracted.

REMARKS

Originally Aetna Engineering did some work on the mechanical arrangement of the system. Th Association has made numerous changes, enlarging the mains to 2 1/2 in. size, changing the pumpi equipment and making other improvements.

BARRETT WATER COMPANY

GENERAL

The Barrett Water Company was developed in 1955 as a necessary adjunct to the sale of about 60 homes constructed by Hildreth E. Barrett known as the Barrett Park subdivision. The service area is located approximately one mile south of Ledyard Center on the west side of Route 117.

The topography of the area is slightly sloping and ranges in elevation from 320 ft to 280 f

The population of the service area is approximately 240. There are 60 metered services. Average daily consumption is 9,600 gallons and summer peak is 15,000 gallons.

SOURCE OF SUPPLY

DESCRIPTION

The source of supply consists of two drilled wells; No. 1, located the Barrett garage, was activated in 1962 and is the major source. Well No. 2, located in the water works facility facing Mylar Drive, is not equipped with a pump.

Drilled Well No. 1 - Diameter: 6 in. Depth: 258 ft
Drilled Well No. 2 - Diameter: 6 in. Depth: 272 ft

WELL PUMPING

A Deming 3 hp turbine pump is installed in Well No. 1 at 90 ft leve with a capacity of 25 gpm. A stand-by pump is on hand for Well No. which can be installed in case of emergency. The capacity of this pump is 10 gpm.

TREATMENT

The supply is untreated.

PUMPING

DESCRIPTION

An 80 gpm 5 hp booster pump is located at the pneumatic tanks.

TRANSMISSION AND DISTRIBUTION

GENERAL

The system is a conglomeration of copper (1 1/2 in. and smaller), plastic (2 in. and smaller) and 6 in. asbestos-cement pipes. The lines are looped; approximately seven properties are crossed by pip lines, the easement situation of which is uncertain.

MATERIALS AND LENGTHS

6 in. asbestos-cement pipe	1,000 ft
2 in. plastic pipe	1,546 ft
1 to 1 1/2 in. miscellaneous pipe	2,600 ft
Total length of mains	5,146 ft

4,600 ft of 3/4 in. copper and plastic service lines.

PRESSURES — There are two distinct pressure zones. At both pumping facilities the pressures range between 35 and 55 psi and at the highest service 25 psi is maintained.

STORAGE FACILITIES

LOCATION — The 10,000 gal steel unit storage tank is located at the well site near the north end of the property. Two smaller tanks are located on Marla Avenue south of Hill Street, near the center of the development.

CAPACITY AND TYPE — A 10,000 gal storage tank at well site, two 1,000 gal pressure tanks and a 1,200 gal pressure tank at Well No. 2.

CONTROL — Automatic.

OPERATION OF SYSTEM

DESCRIPTION — In normal operation water is pumped into the pneumatic tank, supplied with air by a 1/2 hp air compressor, and the lower parts of the system which are connected to the 10,000 gal storage tank. The two smaller tanks are manifolded on the discharge side of a second pump which boosts the pressure to the higher parts of the area.

WATER QUALITY

Samples taken from the system showed the following characteristics:

Turbidity	0 - 1 units
pH	6.2 - 6.6
Chloride	0 - 40 mg/l

WATER RATES

Quarterly billing, minimum charge of $3.50. Step rate system, 60¢ to 45¢ per 100 cu ft.

MAINTENANCE

The system is maintained and operated by Lake Barrett, the president of the company.

CHARLES PFIZER & CO., INC.

GENERAL

The Charles Pfizer Company maintains a research annex at Ledyard. The facility is located east of Juliet Long School. In addition to this facility, the system supplies 10 houses located on Stoddard Wharf Road and St. David's Episcopal Church. Estimated population supplied is 35. The total daily output is approximately 5,500 gal. There are no meters in the system.

SOURCE OF SUPPLY

DESCRIPTION — The source of the supply consists of a driven gravel-packed well approximately 48 ft deep with an 8 in. diameter casing having a screened point.

WELL PUMPING — A Deming vertical turbine pump is installed, having a capacity of 250 gpm at 100 psi pressure. The pump is driven by a 25 hp U.S. Motor. Control is by float level from the storage tank.

REMARKS — The pump, compressor and tank are installed in a concrete walled building, located approximately 1,440 ft north of Stoddard Wharf Road and 1,220 ft easterly of Avery Hill Road, entered from Stoddard Wharf Road.

EMERGENCY — Auxiliary drive is from a Wisconsin air-cooled, 4 cylinder, 60 hp engine using liquid propane as fuel. This fuel is stored in a 500 lb tank which also serves the auxiliary heating unit. Propane is delivered by a local fuel dealer.

TREATMENT

DESCRIPTION — The water is treated with Calgon Micromet crystals, a hexametaphos compound, to control iron content.

TRANSMISSION AND DISTRIBUTION

GENERAL — Transmission mains are mostly 6 in. asbestos cement and cast iron. The few house connections are supplied by a secondary parallel fee line.

MATERIALS AND LENGTHS

6 in. asbestos cement	6,270 ft
6 in. cast iron	1,500 ft
4 in. asbestos cement	1,200 ft
2 in plastic	1,500 ft
Total	10,470 ft

There are five 6 in. gate valves for future connections and blow-of There is one fire hydrant. The services are not metered.

PRESSURES — For individual houses the pressure is reduced.

STORAGE FACILITIES

LOCATION — At well building.

CAPACITY — 6,000 gal.

CONTROL — The level in the tank is maintained by a float level control. A single-cylinder, Curtis air compressor supplies air to pressurize t system. It is controlled by a high-low pressure switch.

MAINTENANCE

The system is maintained by the Company. Samples from the well are tested bacteriologically and chemically each month.

REMARKS

The system was designed by Metcalf & Eddy, Consulting Engineers. Additional plans were presented for an extended water supply system in Ledyard, but these plans were not executed. One additional storage tank is planned for the near future.

COLONEL LEDYARD MOBILE HOME PARK

The Colonel Ledyard Mobile Home Park is located just north of the Submarine Base at the junction of Old Military Highway and Sleepy Hollow Road. The area, which is almost two acres, is subdivided to 18 mobile home lots. The present estimated population is 30. The park was established in 1935.

A dug well, 4 ft in diameter and 14 ft deep, is located near the highway intersection. The yield of the well is adequate, but it has some acid characteristics. Water is pumped by a vertica pump to a 500 gal pneumatic tank which provides 30 to 55 psi pressure in the system. The mains ar 1 1/4 in. plastic pipes.

DOW CHEMICAL COMPANY

The Dow Chemical Company's Allyn's Point Division is located in Gales Ferry west of Route 12. The plant produces synthetic materials. There are approximately 230 employees, working three shift

Water is used for plant processes, cooling purposes and for welfare purposes. For welfare pur poses approximately 6,000 gal per day is used; industrial water is recirculated, total consumption unknown.

The source of supply consists of a small reservoir on Tom Allyn Brook, two gravel packed wells and an infiltration gallery. One of the wells is contaminated with salt water; the other well, a

210 ft drilled well is used exclusively for drinking purposes. This well is pumped by a 250 gpm vertical turbine pump. The industrial system uses one 750 gpm and two 500 gpm pumps. Three additional 1,000 gpm pumps are installed for fire protection.

Industrial water is treated with caustic soda, chlorine and Nalco 19. The drinking water is treated with Nalco 26. A 100,000 gal elevated storage tank serves both industrial and fire fighting purposes. The elevated storage tank is kept 2/3 full at all times for fire protection.

FERRY VIEW HEIGHTS WATER COMPANY

GENERAL

The Ferry View Heights Water Company is owned by Irving Norman, Incorporated, a development corporation whose principal officer is Irving Norman, the owner and operator of this utility.

The service area is located in Gales Ferry just north of Christy Hill Road, approximately 1,000 ft east of Route 12. The total area is about 80 acres. The system originated in 1962. The topography of the service area is hilly with elevations ranging from about 65 ft at the source of water supply to 140 ft at the highest customer. The geology of the area is glacial till with minor terrace deposits and some bedrock exposures.

The population of the service area is approximately 270. There are 78 homes in the area and 64 are currently served by the Company. Future growth is estimated at about 10 houses. There is only one meter in the system. Average daily consumption is 16,000 gal and maximum day about 25,000 gal.

SOURCE OF SUPPLY

DESCRIPTION

The source of supply consists of a gravel packed well and a driven well.

Gravel Packed Well No. 1 - Diameter: 6 in. Depth: 58 ft
Driven Well No. 2 - Diameter: 6 in. Depth: 70 ft

WELL PUMPING

Turbine Deming Pump 43 gpm discharge and 5 hp motor, installed in Well No. 1. A 17 gpm pump is installed at Well No. 2.

In Well No. 1 recharge is from an adjacent swale area; draw-down under normal operating conditions is about 45 ft and static level about 15 ft. It is estimated that the combined sustained yield of both wells is 55 gpm or 65,000 gal per day based on 18 hr pumpage.

REMARKS

During the summer of 1968 there were periodic shortages of water during peak demand hours; the second well was not yet in operation.

The primary well is housed in a concrete block flat roofed structure approximately 8 ft x 10 ft. The supplementary well is housed in a small block structure about 50 yds from the primary pumphouse.

EMERGENCY

A Wisconsin gasoline driven engine provides stand-by power.

TREATMENT

The supply is untreated although there is equipment for chlorination.

TRANSMISSION AND DISTRIBUTION

DESCRIPTION

Distribution mains are all 6 in. asbestos-cement, with 3/4 in. copper services. There are no household meters or fire hydrants. The total length of 6 in. pipe is 6,588 ft.

PRESSURES

The highest customer service pressure is about 45 psi.

STORAGE FACILITIES

DESCRIPTION

One steel pneumatic storage tank, 19,000 gal capacity. The tank is partially housed in the primary pumphouse. The tank operates at about the 10,000 gal level with 60 and 80 psi pressure switches.

OPERATION OF SYSTEM

During usual operation Wells No. 1 and 2 pump directly into the pneumatic tank and from th to the distribution system. There is also a piping arrangement whereby the pump output may byp the pneumatic tank.

WATER QUALITY

Samples taken from the primary well showed the following characteristics:

pH	6.7-7.3
Chloride	0 - 10 mg/l
Total Hardness	0 - 70 mg/l

From Well No. 2 traces of musty odor.

pH	5.9 - 6.3
Nitrogen constituents	Limited amount
Chloride	15 mg/l
Total Hardness	60 - 80 mg/l

WATER RATES

The water rate is $60 per year with quarterly billing.

MAINTENANCE

The owner, Mr. Norman, operates the system and collects revenues. He lives in the immediate area and can respond quickly to service calls. He also has done much of the main installation wo himself.

The entire system is flushed once a year during the summer months.

REFERENCES

The system was engineered by Aetna Engineering.

GRANDVIEW MOBILE HOME PARK

This mobile home park is located at the intersection of Route 12 and Long Cove Road. The pa comprises approximately 5 acres. There are 36 mobile home lots, and the present estimated popula tion is 70.

The source of the water supply is two drilled wells with a combined yield of 30 gpm. There a submersible pump in one of the wells and a vertical turbine pump in the other. The pumps deliv water into a 500 gal and a 1,000 gal pneumatic tank, and from there into the system. The mains a 2 in. plastic pipes.

There are no plans for expansion. The system was engineered by Aetna Engineering.

LEDYARD CENTER SCHOOL

This school which has 650 students and 30 staff members also provides water to the Fire House Town Hall and a church. The system is supplied by an individual drilled well. Three of the other four schools in the town are supplied by individual wells while the Gallup Hill School is supplied by the Lifetime Homes Water and Sewer Company.

LEDYARD VILLAGE HOMEOWNERS' ASSOCIATION

GENERAL

The Ledyard Village Homeowners' Association operates a water utility for the Ledyard Village Development. This medium priced community is located one-half mile north of Ledyard Center on Route 117. The system was constructed in 1963.

The topography of the area is slightly sloping from elevations 230 to 200.

There are 46 unmetered services; the estimated population served is 185.

SOURCE OF SUPPLY

DESCRIPTION	The source of supply is one gravel packed well 8 in. diameter and 27 ft deep.
WELL PUMPING	A 66 gpm vertical well pump delivers water directly into the pressure tank. The well is rated as 84 gpm capacity and the pump capacity is 66 gpm.
REMARKS	The pump is housed in a 12 x 12 ft masonry structure located south of Village Drive, 500 ft from the main highway.
EMERGENCY	There is a gasoline engine driven pump for standby purposes. This pump is rated at 80 gpm and is started monthly to assure its operation.

TREATMENT

Hypochlorinators were installed recently.

TRANSMISSION AND DISTRIBUTION

GENERAL	The system consists of one loop and a short distance of straight line. All pipes are 4 in. cast iron. Total length is approximately 1,500 ft.
PRESSURES	The operating pressure at the tank is 66 psi which assures a minimum static pressure of 30 psi at the highest service.
FIRE PROTECTION	There are 4 hydrants in the system, discharge of which is necessarily limited to the capacity of the pump less concurrent residential consumption.

STORAGE FACILITIES

LOCATION	All tanks are located at the well site, bulkheaded into the pit structure.
CAPACITY	There are two tanks, 2,500 gal each; a third one is planned.
CONTROL	Both pressure and level control operates the well pump.

OPERATION OF SYSTEM

The well pump delivers water into the pressure tank which serves the area directly without further pumping.

WATER QUALITY

The results of laboratory analysis indicated that some pollution was taking place. Figures for nitrates were high and detergents were found in the samples. This problem has been corrected.

Color	0 - 15 units
Odor	earthy
Turbidity	0 - 2 units
pH	6.4 - 7.7
Total Hardness (as C_aCO_3)	0 - 58.0 mg/l

WATER RATES

A flat rate of $9.75 per quarter is charged regardless of use.

MAINTENANCE

The system is maintained by a member of the Homeowners' Association.

REFERENCES

The system was engineered by Aetna Engineering.

LIFETIME HOMES WATER AND SEWER COMPANY

GENERAL

The utility company, Lifetime Homes Water and Sewer Company, is owned by Lifetime Homes, Inc 523 Boston Post Road, Old Saybrook, Connecticut. This firm is an affiliate of Achenbach Realty Companies, George J. Achenbach, president. The development is known as "The Highlands" subdivisi

The service area is located in southeastern Ledyard adjacent to Gallup Hill Road on the west and Shewville Road on the east, approximately 1 1/2 miles southeast of Ledyard High School. The system was originally constructed in 1956.

The topography of the service area is hilly, with elevations ranging from 60 ft at source to 250 at the highest point. The geology of the area is glacial till with underlying hardpan mantle by 1 ft to 3 ft windblown silt; drainage is poor.

There are 388 homes, 212 apartments and the Gallup Hill School supplied by this system. The estimated population served is 2,500. The developer expects to build 104 "Town House" units duri 1969-70 which would increase the population served by approximately 400 persons within three years A proposed Junior High School may be located in the service area.

SOURCE OF SUPPLY

DESCRIPTION

The source of supply consists of one 24 in. diameter gravel packed well 421 ft deep. This well is located adjacent to an artificial lake formed by an earthen dam on Williams Brook. Recharge is from Williams Brook and the lake. A site for a second well 150 ft east of the present well has been selected and tested.

WELL PUMPING

The turbine well pump is rated at 300 gpm and 104 psi at 1,750 rpm, manufactured by Deming, driven by a 30 hp motor. Stand-by power is provided by a Wisconsin gasoline engine.

REMARKS

Pump output is not measured; however, the pump running time is recorded on a clock. On the basis of the pump's rating and operating time per day, the water output averages about 150,000 gal per day.

The well and pumping equipment is housed in a 10 x 10 ft structure.

TREATMENT

The supply is chlorinated with a hypochlorinator. "Alkaline" chlorine solution produces chlorine residual averaging 0.2 ppm.

TRANSMISSION AND DISTRIBUTION

GENERAL

Most lines are looped; there are very few dead-ends. There are 443 services but only 4 are metered.

MATERIALS AND LENGTHS

10 in. cast iron	
8 in. cast iron	9,000 ft
6 in. cast iron	1,530 ft
4 in. cast iron	15,274 ft
1 1/2 and 2 in. cast iron	3,054 ft
	5,769 ft
Total length	34,627 ft or 6.5 miles.

PRESSURES

The standpipe provides a static pressure of 45 psi at the highest service point.

FIRE PROTECTION

There are 19 Mueller fire hydrants located throughout the development At present the Town of Ledyard is not charged for these hydrants, which are apparently the only fire hydrants in Ledyard.

STORAGE FACILITIES

LOCATION

On the west side of Gallup Hill Road diagonally across from the schoo

CAPACITY AND TYPE

300,000 gal standpipe.

CONTROL

Automatic level control and overflow protection.

OPERATION OF SYSTEM

The well pump delivers water directly into the system and the storage tank which rides on the network. The pump is automatically controlled.

WATER QUALITY

Samples taken from the system showed the following characteristics:

Odor	Occasionally musty
Turbidity	0 - 2 units
pH	6.4 - 7.7
Total Hardness (as $CaCO_3$)	0 - 20 mg/l

WATER RATES

The residents pay a total of $10.35 each month for water and sewer service, with $5.00 allocated for water. A requested rate increase is pending.

MAINTENANCE

The utility is managed from the "Allied Brokers" office at the Shopping Center. Billing and service is administered from this office. The water and sewer operation has one operator, with an engineer overseeing the operations.

REFERENCES

Consulting engineer was Henry Souther, Inc., and the system was constructed by LeMay Construction Company of Old Saybrook.

TOWER WATER COMPANY

GENERAL

Tower Water Company serves the Christy Hill and Pheasant Run developments. The system is owned and operated by Robert Waterman, who purchased the system from the developers of the subdivisions.

The service area is located in the southwest section of Ledyard one-half mile east of Route 12. The system was originally installed in about 1961.

The topography of the service area is hilly, with elevations ranging from 200 ft at source to 330 ft at highest customer. The geology of the area consists of glacial till with minor bedrock exposure. There are some peripheral kame deposits. The pine swamp area and adjacent area to the east are underlain with a water bearing gravel deposit. It is within this area that the wells are located.

The present population of the service area is estimated as 1,230. The Pheasant Run development and the new development by I. Norman, Inc., will add another 1,000 to this population within approximately 3 years.

There are 317 services at present, all of which are unmetered. Total consumption registered on the master meter for 1968 was 30.6 million gal, an average of 90,000 gal per day.

SOURCE OF SUPPLY

DESCRIPTION

The source of supply consists of three wells, one regular duty which is No. 3, and two stand-by wells which are used periodically on weekends and during the summer months.

Well No. 1, Gravel-packed	- Diameter:	12 in.	Depth:	36 ft
Well No. 2, Driven	- Diameter:	8 in.	Depth:	37 ft
Well No. 3, Driven	- Diameter:	8 in.	Depth:	43 ft

Recharge of the wells takes place from a pond and swamp.

WELL PUMPING

The capacity of well No. 3 is estimated to be between 250 and 450 gpm. A safe output of 450 gpm was stated by a consultant; however, the long-term yield is estimated to be considerably less.

The regular duty well No. 3 is equipped with a 600 gpm 30 hp turbine pump with a propane engine stand-by.

The total capacity of the two stand-by pumps is 175 gpm. They operate in series, as described under "Operation of System." These pumps are driven by 3 and 15 hp motors.

REMARKS

Well No. 1 is located in a 12 x 14 ft concrete and concrete-block house, and well No. 2 is outside this structure. Well No. 3 is housed in a 16 x 24 ft concrete well structure. The area surrounding the wells is enclosed by a locked chain-link fence.

TREATMENT

The supply is untreated.

PUMPING

GENERAL

On the regular duty well, pumping to the system is accomplished by the well pump. The stand-by system consists of a 3 hp well pump and a 15 hp high pressure pump taking its suction on the gravity tank and discharging into the pressure tank.

CONTROL

Each pumphouse is equipped with a flow meter. The pumps operate on pressure and level control.

TRANSMISSION AND DISTRIBUTION

GENERAL

Distribution mains are substantially all 6 in. with a limited amount of 2 in. lines. The older services are 3/4 in. copper; more recent ones are 3/4" polyethylene. The individual customers are not metered.

MATERIALS AND LENGTHS

6 in. asbestos-cement	39,516 ft
2 in. asbestos-cement	1,820 ft
1 to 1 1/2 in. copper and polyethylene	1,090 ft
Total length	42,426 ft (7.4 miles)

PRESSURES

The pressures range from 20 psi to 55 psi, according to the elevations.

FIRE PROTECTION

There are no hydrants in the system.

STORAGE FACILITIES

LOCATION

All storage facilities are located at the well site. The 5 and 15,000 gal tanks are located at Well No. 1, and the 20,000 gal tank is at Well No. 3.

CAPACITY AND TYPE

20,000 gal steel pressure tank
15,000 gal steel storage tank
5,000 gal steel pressure tank

CONTROL

All automatic level and pressure control.

OPERATION OF SYSTEM

The pumps in No. 1 and 2 wells deliver water into the storage tank. High pressure pumps transfer water to the pressure tank, raising pressure to the required level. The pumps in well No. 3 deliver water directly into the pressure tank.

WATER QUALITY

Wells 1 and 2 have occasionally high color and twice showed coliform organisms in the samples.

Turbidity	0 - 6 units
pH	5.6 - 6.2
Nitrate	0 - 4.0 mg/l
Chloride	0 - 25.0 mg/l
Total Hardness (as $CaCO_3$)	0 - 50.0 mg/l

WATER RATES

Billing is done quarterly; the charges are $14.25.

MAINTENANCE

The owner, Mr. Waterman, operates the system personally. He owns excavating equipment and takes care of emergencies and repairs.

VALITY DEPARTMENT STORE

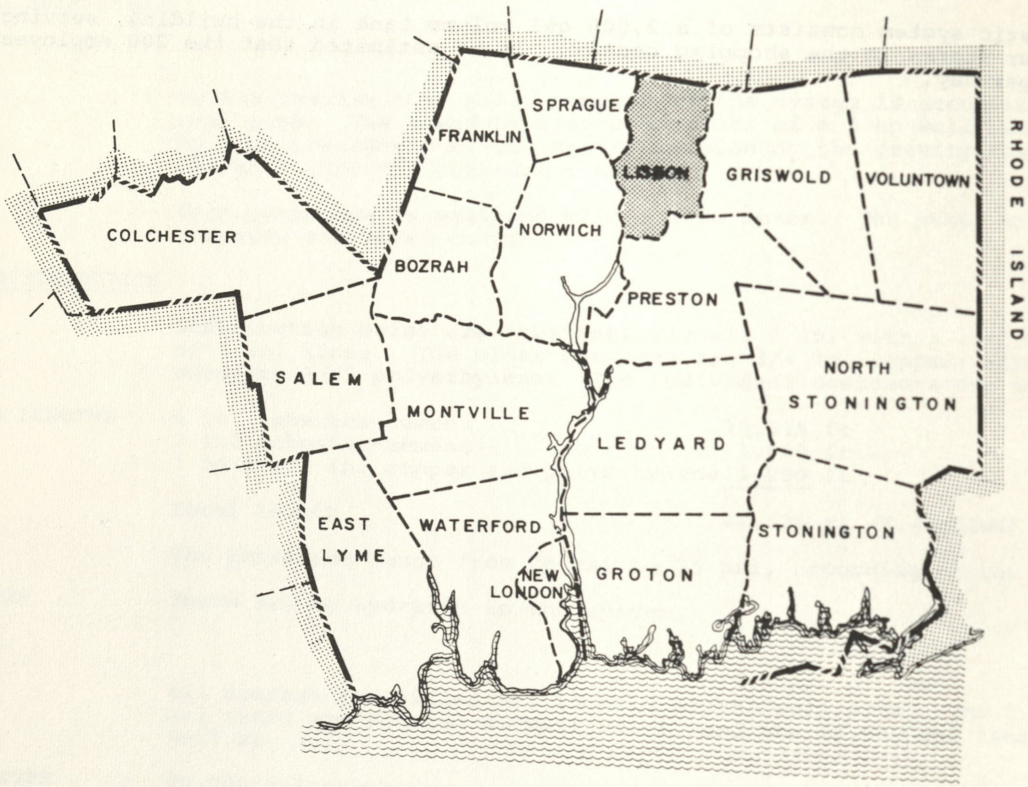
This shopping center, located in Gales Ferry, has a system providing fire protection and water supply for general welfare purposes.

Originally, the source of supply was a 2 and 5 gpm well, but this supply was found to be inadequate. A new well producing 17 gpm was drilled.

The fire protection system consists of a 200,000 gal underground concrete tank which supplies a sprinkler system and four hydrants attached to the building.

The domestic system consists of a 2,000 gal volume tank in the building, serving the department store and other stores in the shopping center. It is estimated that the 200 employees consume 3,000 gal of water per day.

LISBON



GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

The Town of Lisbon covers 16.8 square miles and is located along the northern border of the Region. The topography is very hilly throughout, with elevations ranging from almost 100 feet along the southern borders to almost 400 feet in the northern part of the town. The relief is generally about 150 feet, although there are several exceptions in excess of this average.

TRANSPORTATION

Freight service is available from the New Haven Railroad and numerous trucking firms. State Routes 169 and 12 pass through the town.

INSTITUTIONS AND INDUSTRY

There are no major institutions or industries in Lisbon.

GOVERNMENT

Lisbon's government includes a board of selectmen, town meeting, and a board of finance.

POPULATION

The town's population is widely scattered with the largest concentration occurring in the southwestern corner of the municipality. The total population is relatively low, being only 2,019 in 1960 and estimated to be 2,900 at the present time.

WATER SYSTEMS

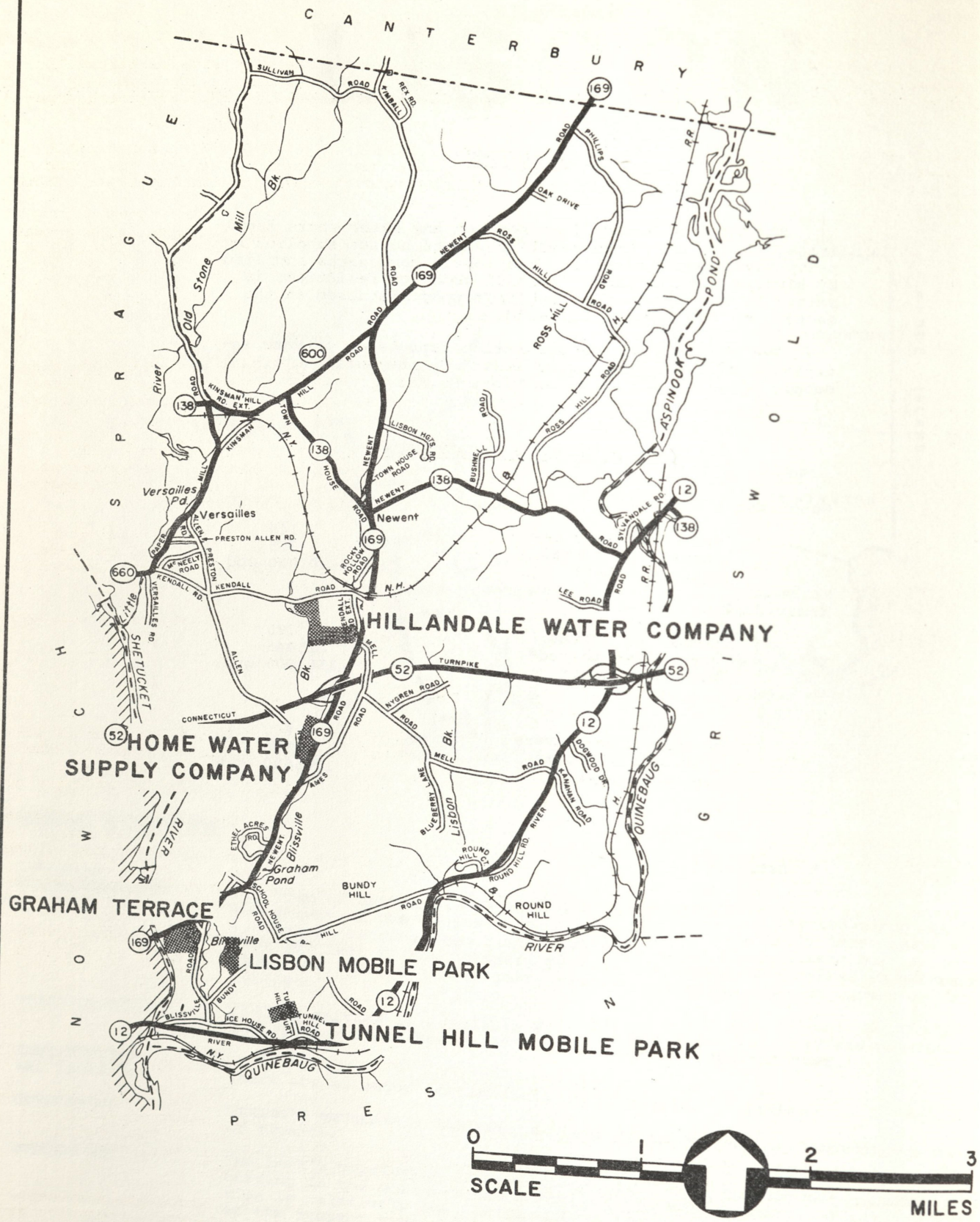
The Town of Lisbon does not own any water works facilities. There are three small groups of houses supplied by privately owned systems and two mobile home parks supplied by similar arrangements. A small group of residences is served by the Jewett City public supply discussed in the section on the Town of Griswold.

The majority of the population depends on private individual sources. The areas served by the small water-supply agencies are shown on Plate No. 12.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	140
Population served	355
Average output	20,000 gpd
Individual Wells	
Number of wells*	720
Population served*	2,445
Average output*	150,000 gpd
TOTAL	
Number of consumers	860
Population served	2,800
Average output*	170,000 gpd

* Estimated



TOWN OF LISBON

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 12

GRAHAM TERRACE

Graham Terrace subdivision is located north of Bundy Hill Road on the west side of Blissville Pond. The development consists of 33 homes on 1/2 acre lots. The development is approximately 15 years old. The area is flat at elevation 100. The water level in the pond is 90. Estimated population is 90 and average daily consumption is 4,800 gal.

The source of supply is an 80 ft deep, 6 in. diameter, drilled well. A 1 1/2 hp submersible pump is installed in the well which discharges into a 500 gal pneumatic tank. The well is in the basement of the owner's home and the pneumatic tank is partially in the wall of the basement. There are no meters.

The distribution system consists of 3 in. and 2 in. plastic pipes partially looped. The annual rate is $40 per service.

HILLANDALE WATER COMPANY

The Hillandale subdivision is located about 2,000 ft north of the Connecticut Turnpike on the west side of Route 169. The present 10 services are located on both sides of Strnad Road. Elevations range between 180 and 250 ft. Estimated population is 40 and the daily water consumption is approximately 2,400 gal. There are no meters in the system.

The source of supply is a 106 ft deep, 6 in. diameter, drilled well, with a 35 gpm yield. A 3/4 hp centrifugal pump discharges into an 80 gal pressure tank and to the system. The system was installed in 1966. Samples taken by the State Health Department showed some nitrogen constituents, high chloride and sodium content (19.0 mg/l) and moderate hardness (46.0 mg/l).

The distribution system consists of a single 6 in. asbestos-cement main which was laid with provision for further expansion. The entire tract consists of 100 acres. The length of the main is approximately 1,200 ft; 3/4 in. services connect the customers. Pressure in the system ranges from 25 to 50 psi. All services are copper.

The annual service rate is $40 for families with children and $30 for those without children.

HOME WATER SUPPLY COMPANY

The Home Water Supply Company is owned and operated by Edward Strnad. The service area is located on the west side of Route 169 approximately 1,000 ft south of the Connecticut Turnpike. The area is almost level at elevation 140. There are 10 homes connected to the supply, which were built between 1960 and 1964. The estimated population is 35, and daily consumption approximately 2,100 gal.

The source of supply is a 12 in. dug well, 15 ft deep, located at the southern edge of the area. The water level in the well is higher than the water level in a nearby pond. This well is constructed of tile pipe with sealed joints. The cover is made of concrete, loosely laid on top of the tile pipe. There are two subsurface sewage systems in the vicinity of this well. One belongs to Edward Strnad and is located approximately 250 ft from the well. The other system is approximately 150 ft from the well.

A 1 hp pump delivers water into an 80 gal pressure tank located in the basement of the Strnad residence. A single 2 in. diameter plastic pipe delivers water to the houses which are serviced by 1/2 in. lines. There is no treatment.

Service rates are $30 and $40 per year, according to the size of the family.

LISBON MOBILE PARK

Lisbon Mobile Park is located on the east bank of Blissville Pond, 400 ft north of Bundy Hill Road. The park consists of 9 acres which are subdivided into 61 mobile home lots. The area is slightly sloping toward the pond. Elevations range from 100 to 150 ft. The park was established in 1957. The estimated population is 130, daily estimated consumption 6,500 gal.

The source of supply is a drilled well, 145 ft deep, 6 in. diameter. A submersible pump delivers water into a 1,000 gal storage tank with a pressure switch actuating the pump. Pressures at the tank discharge range from 35 to 55 psi. The pump and storage tank are located underneath the

office building. There are no meters in the system. From the pneumatic tank the water passes through a pressure filter for iron removal. There are two parallel pressure tanks. There is no emergency power source.

The distribution system consists of a complete loop of 3 in. and 2 in. diameter plastic pipe Two valves are installed in the loop. Service lines are plastic. Water service charges are incl in the lot rents.

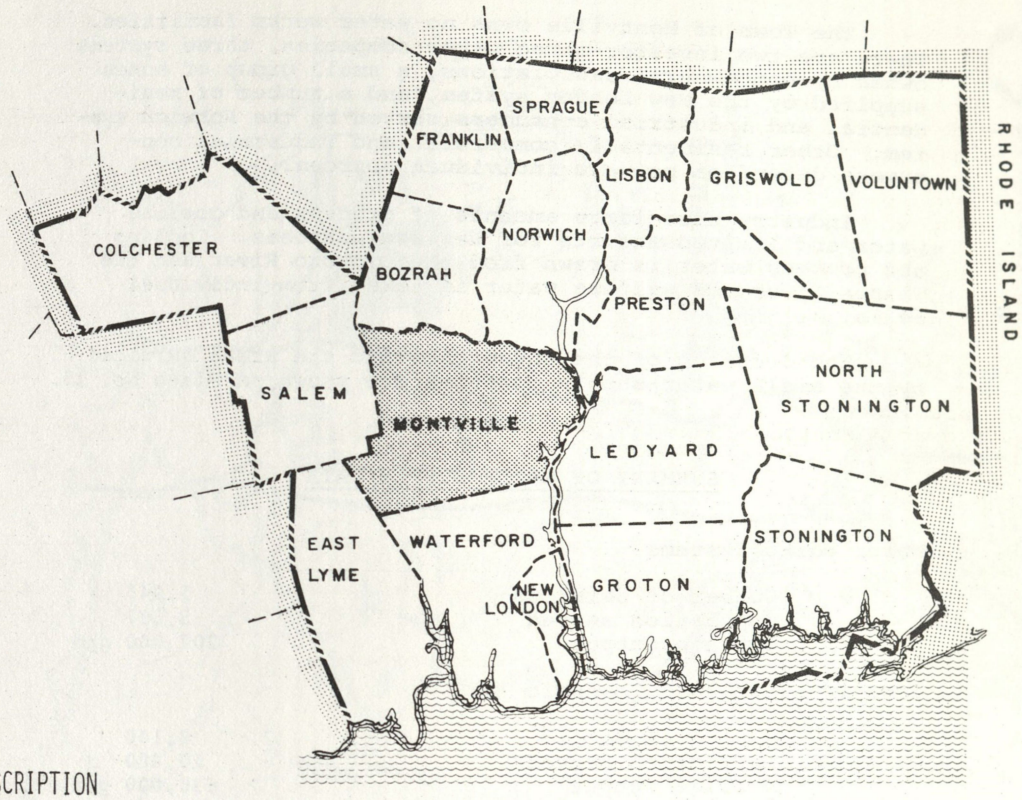
TUNNEL HILL MOBILE PARK

Tunnel Hill Mobile Park is owned and operated by Arthur Mellor. The park is located near th southern edge of Lisbon off Route 12 at the end of Tunnel Hill Court. The park was established i 1965. The area is relatively flat; elevations range from 110 to 140 ft. The area encompasses 4 acres of land, with 26 mobile homes and an estimated population of 65. Daily estimated water con sumption is 3,300 gal.

The source of supply is a 6 in. diameter drilled well, 248 ft deep, with a yield of 75 gpm. There are two pumps installed in the well, but only one is working; the other is for emergency us The pump discharges into two parallel-connected 150 gal pressure tanks connected to the distribut system.

The distribution system consists of 3 in. diameter plastic pipes, with no shut-off valves or meters. The tanks are installed in a 5 x 8 ft concrete pit, located above the well. Water servic is provided as part of the rental charge. The system was installed by the owner, who is a general contractor.

MONTVILLE



GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Montville, covering 45 square miles, is near the center of the Region with the Thames River forming its eastern boundary. Elevations increase steadily from sea level along the Thames River to over 600 feet near the western border. Relief varies from one part of the town to another, but is generally around 200 feet between hilltops and valley floors. Broad areas of good building land are found on the ridge tops along the Thames River and on those running from southeast to northwest through the town.

TRANSPORTATION

Freight service is available from the Central Vermont Railroad and several trucking firms. Major highways passing through the town include the Connecticut Turnpike and State Routes 32, 163, 82, and 85.

INSTITUTIONS AND INDUSTRY

The state jail serving this part of Connecticut is located in Montville. There are several important industries whose products include paper board, paper boxes, water filters, tachometers, and the assembling of nuclear generators. A major electrical power plant is also located here. Numerous businesses are scattered throughout the town, but the only real concentration of commercial activity is in the Village of Stonington.

GOVERNMENT

Montville has a selectmen-town meeting-board of finance form of government.

POPULATION

Most of the town's population is located in the corridor between the Connecticut Turnpike and the Thames River and along the ridge extending northwesterly from Uncasville. The population has grown rapidly during this decade, increasing from 7,759 in 1960 to an estimated current level of almost 13,800.

WATER SYSTEMS

The Town of Montville owns no water works facilities. There are two investor-owned water companies, three systems owned by homeowners' associations, a small group of homes supplied by the New London system, and a number of residential and industrial consumers served by the Norwich system. Other residential, commercial and industrial consumers depend on private individual sources.

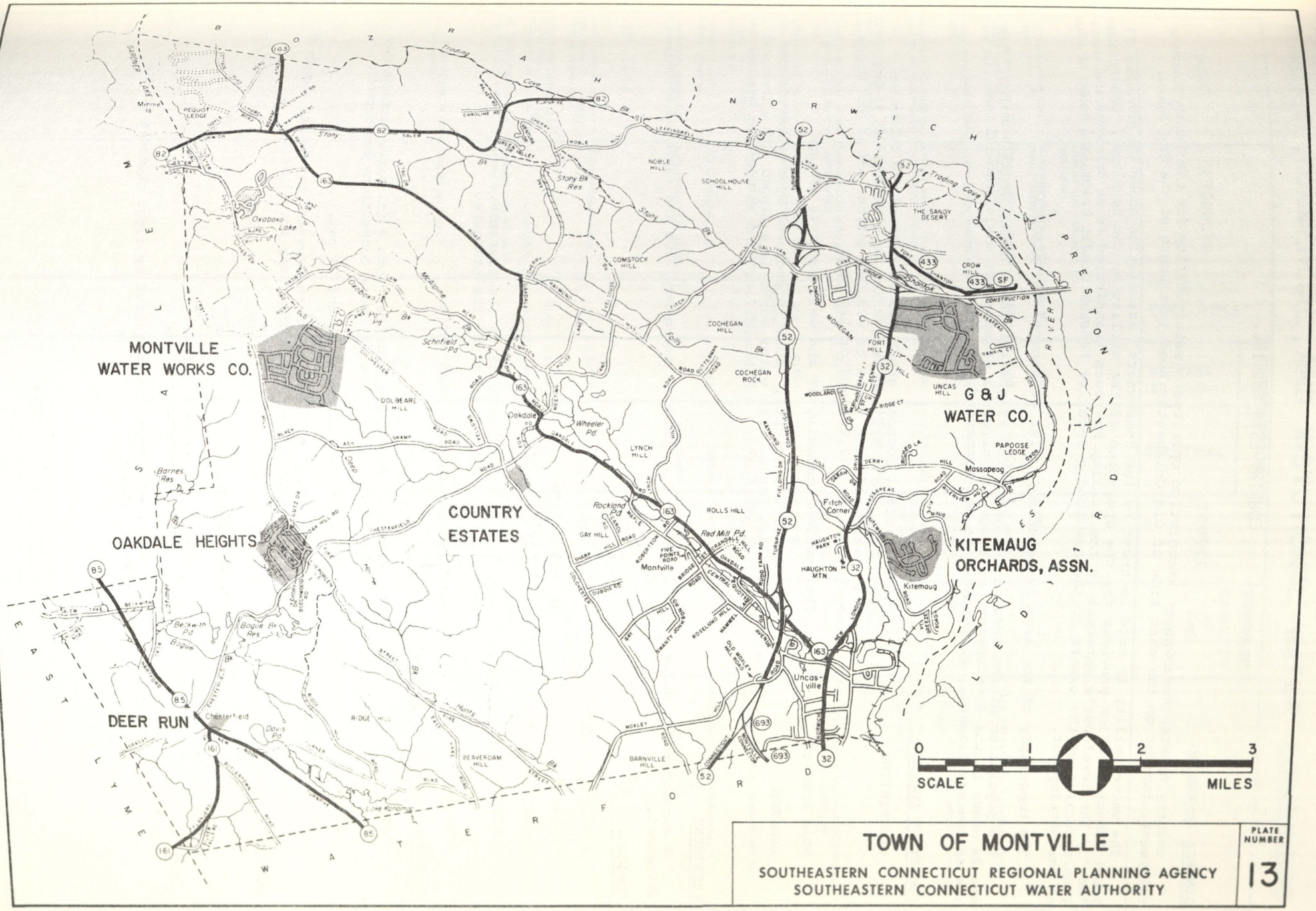
Industry uses large amounts of process and cooling water and limited amounts for welfare purposes. Cooling and process water is drawn from the Oxoboxo River and the Thames River and welfare water is taken from individual wells.

The location of the industries and the areas serviced by the small water-supply agencies are shown on Plate No. 13.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	1,047
Population served	3,537
Average output	207,000 gpd
Individual Wells - Domestic	
Number of wells*	3,100
Population served*	10,400
Average output*	630,000 gpd
Individual Wells - Industrial	
Number of wells	20
Average output*	25,000 gpd
TOTAL	
Number of Consumers	4,167
Population served	13,937
Industries served	14
Average output*	862,000 gpd

* Estimated



TOWN OF MONTVILLE

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 13

COUNTRY ESTATES, INC.

GENERAL

Country Estates Homeowners' Association operates a water utility for the Country Estates Development, located on the east side of Old Colchester Road just south of the High School.

The water utility is held in trust by the homeowners' association under the provisions of a trust indenture which provides for the operation of the utility by the developer, "Country Estates Inc.". The developer's interest in the utility has been transferred to an unincorporated association comprised of the owners of the New London Security Federal Credit Union, the holder of a lien on the development.

The topography of the area is relatively flat at general elevation 340.

The population of the area is 100, of which 87 are currently served by this utility. There are 24 homes in the development, although the original development envisioned 105 homes, for which the system was planned. Five homes are not connected.

SOURCE OF SUPPLY

DESCRIPTION	The well site, located about 325 ft east of Old Colchester Road, contains a drilled well 8 in. in diameter, 226 ft deep, with estimated safe yield of 129,000 gallons per 18 hour pumpage, equivalent to 172,000 gpd or 120 gpm.
WELL PUMPING	The combined capacity of the well pumps is 130 gpm.
REMARKS	The concrete block pump house is enclosed by a locked six-foot chain link fence. The water works is equipped with a thermostat operated gas heater, a dehumidifier, and an emergency gasoline engine.

TREATMENT

A semiautomatic chlorinator is on hand in case of emergency, but the supply is normally untreated.

PUMPING

High Lift Pumps

LOCATION	In pump house.
CAPACITY AND TYPE	Combined capacity 130 gpm, type not known.
CONTROL	Pump No. 1 is activated at 85 lbs pressure. Pump No. 2 is activated at 65 lbs pressure.
EMERGENCY	Gasoline engine, as noted above.

TRANSMISSION AND DISTRIBUTION

GENERAL	The mains are possibly Transite, some 8 in. size, although this is uncertain. All of the 19 house connections are metered.
PRESSURES	The pressures vary between 50 and 70 psi.
FIRE PROTECTION	There are few fire hydrants in the system, but in the absence of elevated storage they are useful only for flushing.

STORAGE FACILITIES

LOCATION	At pump house.
CAPACITY AND TYPE	1 - 25,000 gal storage tank. 2 - 5,000 gal pressure tanks.
CONTROL	Automatic; the pumps are actuated by float switches in each pneumatic tank.

INDUSTRIAL, COMMERCIAL, AND INSTUTIONAL WATER CONSUMERS

COMPANY	PRODUCTS	EMPLOYEES*	CONSUMPTION (gpd) WELFARE (20 gpc/day)	CONSUMPTION (gpd) INDUSTRIAL	SOURCE	STORAGE CAPACITY (gal) AND TYPE	REMARKS
INDUSTRIES							
Jay Fro, Inc., Route 163	Manufacturer of playground and athletic equipment	30-40	600		1 well		
All Time Manufacturing Company, Route 163	Aluminum doors, windows, screens, etc.	25-30	500		1 well		
Robertson Paper Box Company, Route 163	Paper boxes, packaging manufactured goods	400	8,000	500,000	W-2 wells I-Oxoboxo River		Fire protection directly from river.
Federal Paper Board, Inc., Route 163	Light gauge cardboard	42	850	600,000	W-well I-Oxoboxo River	20,000 standpipe	Fire protection directly from river. 2,000 gpd boiler make-up filtered.
Continental Can Company, Depot Street, Uncasville	Medium weight corrugated cardboard	200	4,000	1,000,000	W-well I-Oxoboxo River	150,000 200,000 standpipes	Reservoirs for fire protection from river. Boiler make-up filtered.
Connecticut Light and Power Company, Montville Power Plant	Electric power	115	2,300	Saline water	W-5 wells I-Thames River	100,000 100,000 standpipes	
Thomas Faria, Inc., Route 32 at Route 163, Uncasville	Tachometers and other instruments	110	2,200		W-well I-Oxoboxo River	140,000 cistern	Well water is not satisfactory. 3 tenants are on system.
United Nuclear Corporation, Sandy Desert Road	Assembly plant for nuclear reactors	100 (300 in future)	2,000	300	Norwich System		
American Machine and Foundry, Cuno Division, Gallivan Lane	Desalinization units	75	1,500	3,000**	Well		Supply for fire protection desired.
Community Cleaners, 4 Corners, Uncasville	Dry cleaning	3	100	300**	3 wells		Wells are not dependable.
Launderette, Montville Highland Center, Route 32	Laundromat (30 units)			2,500**	2 wells	5,000	
INSTITUTIONS							
Cove View Convalescent Home, Route 32, 1 mile north of Uncasville	Convalescent Home	20	2,000		Well 2,000		
Connecticut Correctional Center, Route 32, 1 1/2 miles north of Uncasville		150	7,500		Deep well 46,000	9,000	
Six Public Schools, one Parochial High School	Average school consumption, 2,500 gpd		15,000		Wells		

* Inmates or pupils under "Institutions."
** Estimated.

OPERATION OF SYSTEM

The well pump delivers water into the 25,000 gal storage tank. From this tank water is pumped by horizontal centrifugal high lift pumps into the two 5,000 gal pneumatic service tanks. Float switches in both tanks actuate the well and high lift pumps.

WATER QUALITY

Samples taken from the distribution system showed the following characteristics:

Color	0-5 units
Turbidity	1-3 units
pH	6.8-7.5
Chloride (Cl)	0-5.0 mg/l
Total Hardness (as $CaCO_3$)	50-60 mg/l

WATER RATES

Water rates are 51.5¢ per 1000 gallons, with a minimum of $15.00 per quarter.

MAINTENANCE

The system is not operated in a satisfactory manner by the developer. Presently, there is apparently no person or organization who is responsible for daily surveillance and system maintenance.

DEER RUN SUPPLY

GENERAL

Deer Run Supply is located off Route 85, south of Chesterfield Road.

The system is owned by W. L. Miner. The water supply serving this area is drawn from a New London Water Department line which carries raw water from Barnes and Bogue Brook Reservoirs.

Water is pumped from the pipeline to a 500 gallon pressure tank and is then distributed to the system. A total of 12 homes and one 3-unit apartment are served by this supply. A master meter is located on the intake line in the pump house.

The water is chlorinated with an electrically operated hypochlorinator. The water quality is very poor, with analysis showing a color of up to 49, an earthy odor and high turbidity. Chlorine residual was kept at 2.0 mg/l minimum level. The system appears to be properly operated.

G & J WATER COMPANY

GENERAL

The G & J Water Company serves the development known as "The Lathrop Development." This residential area is located southeast of the Mohegan-Pequot Bridge over the Thames River. This is a high density development of approximately 250 homes in the medium-priced category. The developers are Lathrop Brothers, Inc., of Uncasville, Connecticut. The G & J Water Company is a family corporation.

The service area is hilly, with elevations ranging from 130 ft at the source of supply to 320 ft at the highest customer. The geology of the area is glacial till on bedrock.

The population of the service area is approximately 800, of which 95% are served by the G & J Water Company system with the remainder using residential wells. There are 235 houses in the area, of which 188 are metered. The initial system was constructed in 1960.

SOURCE OF SUPPLY

DESCRIPTION

The source of supply consists of two [gravel-packed] wells located at the northeast edge of the development.
Well No. 1 - Diameter: 8 in. Depth: 100 ft
Well No. 2 - Diameter: 8 in. Depth: 172 ft

WELL PUMPING — The estimated safe yield of the system is 172,800 gpd. Both wells are pumped with submersible pumps controlled with automatic float switches. Well No. 1 capacity is 70 gpm and Well No. 2 is 90 gpm.

REMARKS — No. 1 well is housed in a 12 ft x 12 ft concrete block structure which also encloses the three smaller storage tanks. Adjacent to this is the structure for No. 2 well.

TREATMENT

The supply is untreated.

PUMPING

High Lift Pumps

LOCATION — At well site.

CAPACITY AND TYPE — Two "Taco" pumps, 125 gpm each, 240 ft head and 12 1/2 and 15 hp.

CONTROL — The pumps operate alternately or, when the demand is great, together. Float switches in the pneumatic tanks actuate the pump starters.

EMERGENCY — A gasoline operated auxiliary pump is provided in case of power failure.

Park Avenue Booster Station

LOCATION — On Park Avenue.

PUMPS — Two "Taco" pumps, 125 gpm each, 240 ft head and 15 hp.

CONTROL — Automatic pressure control.

REMARKS — The function of this station is to boost pressure for the high service area. This station was added in 1968. No auxiliary power supply is provided.

TRANSMISSION AND DISTRIBUTION

GENERAL — Distribution mains are 8 in. and 6 in., with one 3 in. cross connection and a short dead-end street served by a 2 in. line. The 8 in. mains were installed with the anticipation of future connection to a Route 32 feeder main.

PIPE MATERIALS AND LENGTHS

8 in. Transite	8,812 ft
6 in. Transite	9,244 ft
2 in. Copper	440 ft
Total Length	18,496 ft (3.5 miles)

No apparent maintenance problems since construction.

PRESSURES — There are two pressure zones as a consequence of large differences in elevations. Near the pump station pressure is 90 psi and at the highest elevation approximately 20 psi, with the booster pumps in operation.

FIRE PROTECTION — There are 11 fire hydrants, but in the absence of elevated storage they are unable to provide normal fire flows; they are, however, useful for flushing purposes.

STORAGE FACILITIES

Main Storage

LOCATION — At pump house.

CAPACITY AND TYPE — 50,000 gal reinforced concrete.

CONTROL — Automatic.

Supplementary Tanks

LOCATION	Same location as main storage.
CAPACITY AND TYPE	Two 10,000 gal steel gravity tanks and one 5,000 gal steel pressure tank.
CONTROL	Automatic, with small air compressor for pressure tank.

OPERATION OF SYSTEM

Both submersible well pumps deliver water into the 50,000 gal tank. This controlling tank is in series with two 10,000 gal steel tanks which are in parallel. Water is pumped from this 60,000 gal volume tank group to a 5,000 gal pressure tank, in which pressure is maintained with the help of a small air compressor. The pressure tank has a 3 in. suction and 8 in. discharge line. Contr of the system is automatic.

WATER QUALITY

Mixed samples taken from the distribution system showed the following characteristics:

Color	0-3 units
Turbidity	0-1 units
pH	7.2-7.4
Chloride (Cl)	0-5 mg/l
Total Hardness (as $CaCO_3$)	0-40 mg/l
Coliform organisms were present twice in Well No. 2 during previous years.	

WATER RATES

There are 188 metered services and 47 flat rate services. Minimum charge is $6.50 for the first 3,750 gallons per quarter. Quarterly billing on a step rate system decreases from 52¢ per 1,000 gal. The flat rate is $15 per quarter.

MAINTENANCE

The Lathrop Brothers are builders and developers and as such have a work force and suitable equipment available to maintain and operate the system. Expansion and construction is taken on under the auspices of the building company and is separately accounted for. The system is flushed once a year. The system appears to meet reasonable water works standards.

REFERENCES

The system was originally engineered by Morton Fine, Inc., with later engineering by Randmetz Inc.

KITEMAUG ORCHARD ASSOCIATION

GENERAL

The Kitemaug Orchard Association, a homeowners' association, operates a water utility for the Kitemaug Orchards Development. This high density community of medium priced homes is located just east of Route 32 approximately two miles north of Uncasville. It is entered via Massapeag Road.

The topography of the area is hilly with elevations ranging from 50 ft at source to 160 ft at highest service. The geology of the area is glacial till with minor bedrock exposure. The well area, on the western end of the tract, is comprised of gravel deposits.

The population of the area is 400, all of which are currently served by this utility. There are 118 homes in the development. The population growth potential of this development is limited, with only seven building lots vacant.

SOURCE OF SUPPLY

DESCRIPTION

The source of supply consists of three wells.

Well No. 1 - Diameter:	6 in.	Depth:	335 ft
Well No. 2 - Diameter:	6 in.	Depth:	212 ft
Well No. 3 - Diameter:	6 in.	Depth:	425 ft

The estimated safe yield of the existing system is 74,500 gpd.

WELL PUMPING — Well No. 1, Deming turbine pump, driven by a 5 hp motor, 35 gpm capacity. Well No. 2 and 3 have submersible pumps 12 and 22 gpm capacities. Automatic level control.

REMARKS — Well No. 1 is located in a concrete block structure, approximately 12 ft by 12 ft in size. The other two wells are within 100 ft of this structure.

TREATMENT

There is no water treatment or chlorination of the system.

PUMPING

High Lift Pumps

LOCATION — The high lift pumps are located in the well pump house.

CAPACITY AND TYPE — Two Deming horizontal centrifugal pumps, driven by 10 hp motors, 100 gpm capacity each pump.

CONTROL — The pumps are actuated by float switches in each pneumatic tank.

EMERGENCY — No auxiliary power is provided.

TRANSMISSION AND DISTRIBUTION

GENERAL — Distribution mains are 6 in. and 4 in. Transite; services are copper. System output is metered by a 3 in. Trident disc meter, but the individual customers are not metered.

MATERIALS AND LENGTH	4 in. Transite pipes	6,600 ft
	6 in. Transite pipes	3,925 ft
	Total Length	10,525 ft (2.0 miles)

FIRE PROTECTION — There are four hydrants in the system, but with 4 in. mains and, in the absence of elevated storage, they are useful only for flushing.

REMARKS — The individual customers do not have shut-off valves, with the exception of approximately five cases.

STORAGE FACILITIES

LOCATION — All storage facilities are located at the pump house.

CAPACITY AND TYPE — 10,000 gal capacity tank.
5,000 gal pneumatic tank.

CONTROL — Automatic; the pumps are actuated by float switches in each tank.

OPERATION OF SYSTEM

The well pumps deliver water into the 10,000 gal tank. From this tank water is pumped by the high lift pumps into the pneumatic tank in which pressure is maintained with the help of a small air compressor. Float switches in both tanks actuate the well and high lift pumps.

WATER QUALITY

Samples taken from the system showed high positive coliform counts on six occasions during 1968. This problem, which was due to insect contamination through vent holes in the storage tanks, was eliminated. All other water quality conditions were within acceptable USPHS Standards.

WATER RATES

A flat rate of $5.00 per month is charged regardless of use. There is a good deal of controversy among the home owners concerning filling of the swimming pools, which are becoming more common in the area.

MAINTENANCE

The system is maintained by the Association, the members taking turns as operators for one-week periods. Repairs of any complexity are accomplished by a contractor. The operation is directed by the Board of Directors of the Kitemaug Orchards Association. The treasurer of this Association bills the customers.

REMARKS

The system was originally constructed by Aetna Engineering. They also had engineering advice from Metcalf and Eddy. As constructed, however, the system does not meet adequate water works standards due to a lack of shutoff valves, prevalence of 4 in. mains and lack of elevated storage.

MONTVILLE WATER WORKS

GENERAL

This utility serves the residential development known as "Montville Manor." It is located to the west of Old Colchester Road about three miles south of Route 82 at Gardner Lake. It consists of 386 medium priced homes plus 60 apartment units.

The utility is owned by Southern Gulf Utilities, Miami, Florida. The water utility was sold to Southern Gulf by the developer, Barber and Stevens, in 1966.

The topography of the service area is relatively flat, with some hills in the northwest section. The area exceeds 200 acres. Elevations range from 530 ft at the pump house to 580 ft at highest service. The geology of the area is shallow glacial till over bedrock. Present population is 1480 based on 3.4 persons per house and 2.8 per apartment. The future expansion of this development is limited by the approximately 10 building lots now available. The system was installed in 1957.

SOURCE OF SUPPLY

DESCRIPTION

The sources of supply are rock wells located within the general vicinity of the pump house, which is located on the north side of Connecticut Avenue.

Well No. 1	Discontinued						
Well No. 2	Diameter:	6 in.	Depth:	207 ft	Capacity:	24 gpm
Well No. 3	Diameter:	6 in.	Depth:	211 ft	Capacity:	18 gpm
Well No. 6	Diameter:	6 in.	Depth:	300 ft	Capacity:	63 gpm
Well No. 7	Diameter:	6 in.	Depth:	300 ft	Capacity:	75 gpm
Well No. 8	Diameter:	6 in.	Depth:	600 ft	Capacity:	27 gpm
Well No. 10	Diameter:	6 in.	Depth:	225 ft	Capacity:	35 gpm

All capacities listed were based on inspection at the initial construction of the wells. Actual yield may be considerably lower.

WELL PUMPING

Well No. 2	D.W. Turbine pump	5 hp motor	High pressure
Well No. 3	D.W. Turbine pump	5 hp motor	High pressure
Well No. 6	D.W. Turbine pump	10 hp motor	Supply
Well No. 7	D.W. Turbine pump	7.5 hp motor	Supply
Well No. 8	D.W. Turbine pump	5.0 hp motor	Supply
Well No. 10	D.W. Turbine pump	3.0 hp motor	Supply

All pumps are controlled automatically by water level in the storage tanks.

REMARKS

The 16 ft x 10 ft pump house, which backs onto a 50,000 gal concrete storage tank, is of block construction and flat roofed. Within the pump house are the two pneumatic tanks.

TREATMENT

The supply is untreated.

PUMPING

High Lift Pumps

Location

In pump house.

CAPACITY AND TYPE	Two horizontal centrifugal pumps, 250 gpm each, powered by 20 hp motors.
CONTROL	The pumps are actuated by float switches in each pneumatic tank.
EMERGENCY	A small gasoline engine and pump, poorly maintained and inadequate in capacity.

TRANSMISSION AND DISTRIBUTION

GENERAL	Distribution mains are mostly 6 in. with some 4 in., with 3/4 in. services to the homes. There are 379 homes with meters, and the apartment complexes, containing 60 customers, are metered on two master meters.
MATERIALS AND LENGTH	All mains are cast iron; services are copper. Total length of mains is 4.93 miles.

6 in. cast iron pipes	24,250 ft
4 in. cast iron pipes	1,800 ft
Total	26,050 ft - 4.93 miles

PRESSURES	The pressure, according to geographical location, varies between 60 and 80 psi.
FIRE PROTECTION	There are 28, 4 in. fire hydrants in the system but, in the absence of elevated storage, they are unable to provide normal fire flows; they are, however, useful for flushing purposes.

STORAGE FACILITIES

LOCATION	At pump house.
CAPACITY AND TYPE	1 - 50,000 gal concrete tank. 3 - 5,000 gal steel tanks.
CONTROL	Automatic; the pumps are actuated by float switches in each pneumatic tank.

OPERATION OF SYSTEM

Both submersible well pumps deliver water into the 50,000 gal concrete tank. From this tank water is pumped by the horizontal centrifugal high lift pumps into two cross-connected pneumatic service tanks. Pressure in these tanks is maintained with the help of a small air compressor. Float switches in both tanks actuate the well- and high-lift pumps.

WATER QUALITY

Mixed samples taken from the distribution system showed the following characteristics:

Color	3-6 units
Odor	earthy, musty; degree: 0-2
Turbidity	1-2 units
pH	6.8
Some Nitrogen constituents	
Total Hardness (as $CaCO_3$)	50-60 mg/l
Chloride (Cl)	7-9 mg/l

WATER RATES

All services are metered. Water charges for apartments are paid by the developer and absorbed in the rent.

MAINTENANCE

Day to day operation is by a Montville resident on a part-time basis. Maintenance, repair and necessary expansions are accomplished by Dufford Drilling Company of East Glastonbury.

The gasoline engine had not been test-run in a considerable length of time. Hydrants are flushed annually.

REMARKS

The Public Utilities Commission has recommended doubling of the 50,000 gal storage capacity the addition of wells. The system appears to be marginally adequate.

OAKDALE, INC.

GENERAL

Oakdale Heights development is located on Chesterfield Road approximately two miles east of Route 85. It consists of 212 medium priced homes.

Oakdale, Inc., the developer of Oakdale Heights, operates a water system, which according to the developer, is held by the Oakdale Heights Homeowners Association under a trust indenture.

The topography of the area is moderately hilly with elevations ranging from 300 ft at the southwest edge to 430 ft at Four Corners. (Intersection of Chesterfield and Chapel Hill Road.)

The population served is approximately 720, all of which are served by the utility. There is no significant future development planned in the immediate area.

The system was constructed in 1962.

SOURCE OF SUPPLY

DESCRIPTION

The source of supply consists of four wells at two locations.

Site 1: About 100 ft north of Laurel Avenue near brook.
Well No. 1 Diameter: 6 in. Depth: 410 ft Yield: 57,600 gpd
Well No. 2 Diameter: 6 in. Depth: 500 ft Yield: 14,400 gpd

Site 2: On Hickory Drive about 80 ft higher than Site 1.
Well No. 3 Diameter: 6 in. Depth: 375 ft Yield: 57,600 gpd
Well No. 4 Diameter: 6 in. Depth: 375 ft Yield: 50,400 gpd

Well No. 3 is not in use because of detergent pollution.

WELL PUMPING

Site 1: Deming vertical pump, 5 hp submersible pump. Automatic level control.

Site 2: Same setup as at Site 1.

REMARKS

At both sites one well is located in a pump house approximately 10 ft x 10 ft square, of concrete block construction and flat roofed. The pump houses are built in back of 30,000 gal storage tanks at each location and a 5,000 gal pneumatic tank is also extended into each house.

TREATMENT

The supply is untreated.

PUMPING

High Lift Pumps

LOCATION

The high lift pumps are located in each well pump house.

CAPACITY AND TYPE

Two Deming horizontal centrifugal pumps at each station, driven by 5 hp motors, 75 gpm.

CONTROL

The pumps operate automatically under pressure control with a timing device installed at Site 2, which alternates the pumping between the two sites.

EMERGENCY

Both stations have gasoline engines of about 5 hp with attached pumps to provide service in the event of power failure.

TRANSMISSION AND DISTRIBUTION

GENERAL	Distribution mains are 6 in. cast iron pipes; services are copper. There are about 214 connections. None of the services or well outputs are metered.
LENGTH OF PIPES	6 in. supply pipe — 800 ft 6 in. distribution pipe — 9,500 ft 4 in. distribution pipe — 2,500 ft Total Length — 12,800 ft (2.40 miles)
CONDITION OF SYSTEM	There are no apparent maintenance problems.
PRESSURES	There is one pressure zone in the system; due to the considerable elevation difference between the pump stations, they provide different heads to maintain the same static level. At Site 1, the pressure is 70 to 80 psi; at Site 2, 35-40 psi.
FIRE PROTECTION	There are 10, 6 in. hydrants in the system, but in the absence of elevated storage they are useful only for flushing.

STORAGE FACILITIES

LOCATION	All storage facilities are located at the well site pump houses.
CAPACITY AND TYPE	Each site has a 30,000 gal concrete tank and a 5,000 gal pneumatic tank.
CONTROL	Automatic - the pumps are actuated by float switches in each pneumatic tank and concrete tank. An alternating device is described under high lift pumps.

OPERATION OF SYSTEM

All well pumps deliver water into the 30,000 gal concrete tanks. From the concrete tanks water is pumped by horizontal centrifugal high lift pumps into the pneumatic service tanks. Pressure in these tanks is maintained with the help of small air compressors. Float switches in both tanks actuate the well and high lift pumps, and additional controls alternate pumping at the two stations.

WATER QUALITY

Samples taken from all wells showed the following characteristics:

Color	3-5 units
Odor (degree)	0-1
Turbidity	1-5 units
pH	6.3-7.1
Chloride (Cl)	5-12.0 mg/l
Total Hardness (as $CaCO_3$)	50.-70. mg/l

WATER RATES

Water rates are uniformly $15.00 per quarter, regardless of use.

MAINTENANCE

The day to day checking and operation of the plant is accomplished on a part-time basis by an employee of the developer who lives in the subdivision area. His main function is to make visual check of the pump houses, motors, gauges, etc. Repairs are accomplished by a contractor. Flushing is performed once a year.

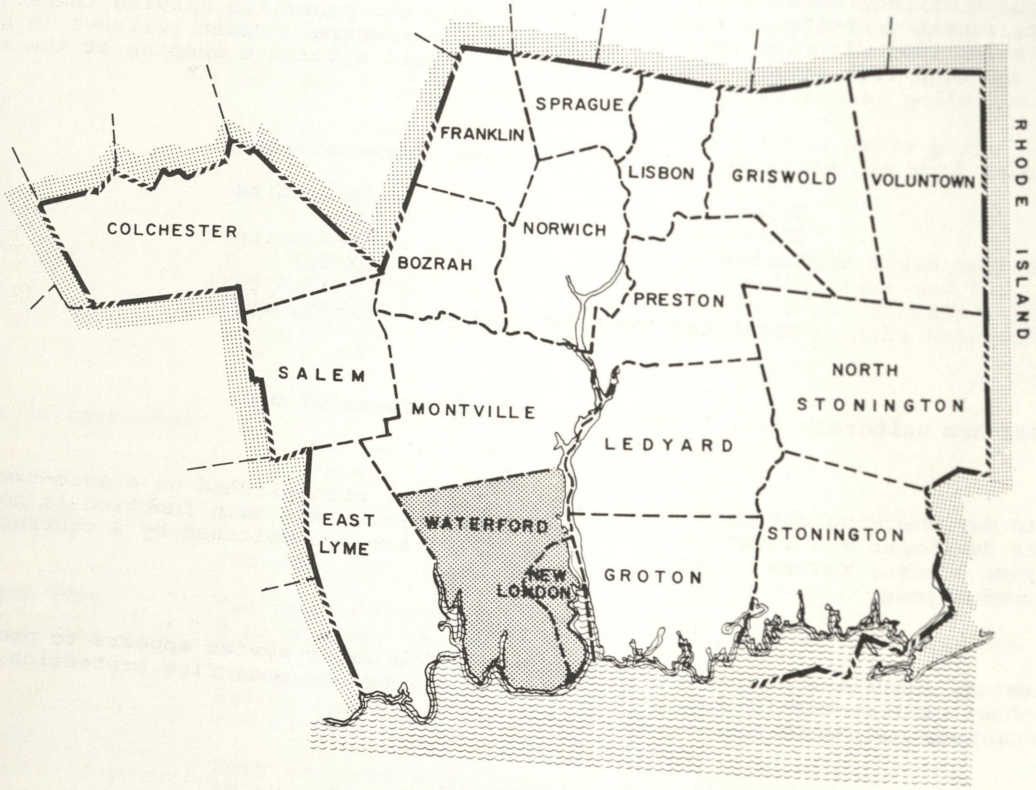
REMARKS

The system was engineered by Aetna Engineering. The water system appears to provide adequate service, its chief deficiencies being lack of elevated storage, poor fire protection, no meters, and less than optimum maintenance.

NEW LONDON

AND

WATERFORD



NEW LONDON

GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

The city is located on the westerly shore of the Thames River estuary at the point where it joins Long Island Sound. It is the Region's smallest community, having an area of only 6.2 square miles. The land rises gently from the water front to a maximum elevation of about 240 feet in the northern part of the city.

TRANSPORTATION

New London has excellent transportation facilities. It offers passenger service by bus, rail, and ferry, and freight service by truck, rail, and ocean freighters. The City lies astride Interstate Route 95 and U.S. Route 1 and is a terminal point for State Routes 85, 32, and 156.

INSTITUTIONS AND INDUSTRY

Major institutions in New London include the U.S. Coast Guard Academy, Connecticut College, and the U.S. Naval Underwater Sound Laboratory. Principal industries include marine construction, and the manufacture of collapsible tubes, dentifrice, floor covering, woodworks, paper products, apparel, and toys. New London is the largest commercial center in the southern part of the Region.

GOVERNMENT

New London has a city manager-council form of government.

POPULATION

The estimated present population is 31,700 and densities are relatively high throughout the entire city. Few large tracts of undeveloped land remain within the city limits. Urban renewal activities and out migration have resulted in a population decrease since 1960 when the population was 34,182.

WATERFORD

GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Waterford was once a part of New London and is located to the west and north of that city. The town covers 37.9 square miles, and its borders include frontage on Long Island Sound and both the Thames and Niantic Rivers. Elevations rise from the lowland along the coast to about 400 feet on the numerous hills in the northern part of the town. Relief averages about 200 feet between stream valleys and hilltops.

TRANSPORTATION

Passenger service is limited to buses and charter air flights at the New London Airport, while the railroad and motor carriers provide freight service. Major highways passing through Waterford include Interstate Route 95, the Connecticut Turnpike, U.S. Route 1, and State Routes 156, 85, and 32.

INSTITUTIONS AND INDUSTRY

The Seaside Regional Center, a state facility for the handicapped, is Waterford's largest institution. Manufacturing activities are few in number in the town but warehousing and wholesale distribution activities are increasing rapidly. Also located in Waterford is the large Millstone Point Atomic Generating Station.

GOVERNMENT

Waterford's form of government involves a board of selectmen, a representative town meeting, and a board of finance.

POPULATION

The 1960 population of 15,391 has grown to an estimated current level of 18,000 persons. The population is found in scattered settlements throughout the eastern and southern parts of the town.

WATER SYSTEMS

The City of New London and the Town of Waterford are discussed jointly, since the public water supply system of the City of New London is also servicing a large part of the Town of Waterford. The Waterford Water and Sewer Commission, the organization in charge of the public facilities in Waterford, is fully dependent on the New London system for water supply and maintenance. There are four small independent private water companies in Waterford and one small independent group which obtains its supply from the New London public supply system.

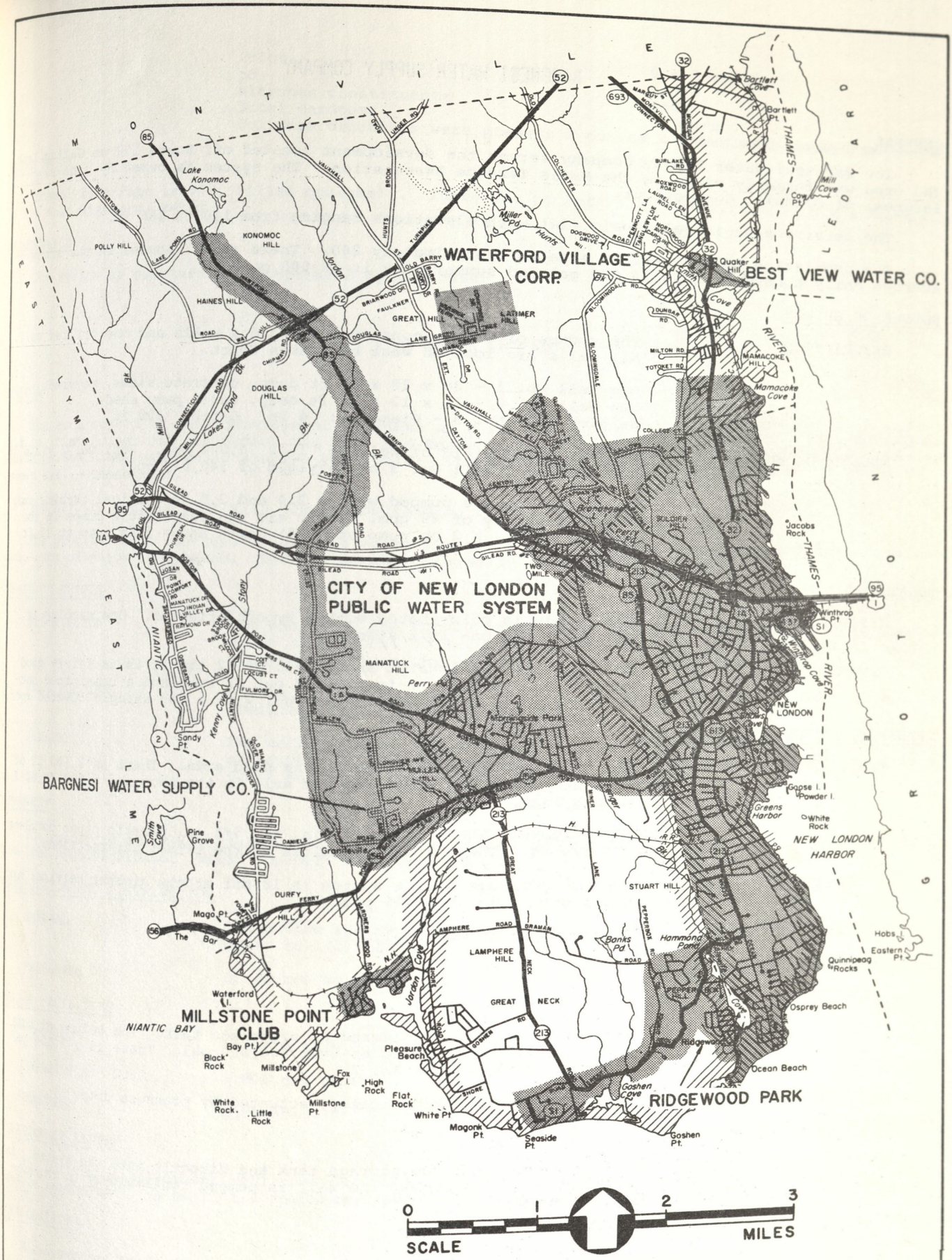
Industry uses considerable amounts of process water supplied by the New London system and the Millstone Nuclear Power Station in Waterford uses large amounts of sea water for cooling purposes.

The locations of the small water supply agencies are shown on Plate No. 14.

SUMMARY OF WATER SUPPLY DATA

	New London	Waterford	Total
Water Works Systems			
Number of services	6,737	1,058	7,795
Population served	32,000	4,235	36,235
Average output	4,340,000	326,000	4,666,000 gpd
Individual Wells - Domestic			
Number of wells*	--	3,960	3,960
Population served	--	13,465	13,465
Average output*		808,000	808,000 gpd
TOTAL			
Number of consumers			11,755
Population served			49,700
Average output*			5,474,000 gpd

* Estimated



NEW LONDON & WATERFORD

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 14

BARGNESI WATER SUPPLY COMPANY

GENERAL

The Bargnesi Water Supply Company serves the development located off Route 156 on Gallup La The area was formerly known as the Maple Terrace Association. The system is owned by John P. Bargnesi of Oakdale, Connecticut.

The service area is relatively flat with elevations ranging from 110 to 160 ft.

The population of the service area is approximately 260. There are 77 houses in the area. Average daily consumption is 14,000 gal and summer peak is 18,000 gal.

SOURCE OF SUPPLY

DESCRIPTION

The source of supply consists of two dug wells and one drilled well All wells are located west of Wiemes Court.

Dug Well No. 1 - 28 x 28 x 28 ft deep, concrete sides, covered.
Dug Well No. 2 - 12 x 12 x 15 ft deep, under pump shed.
Drilled Well No. 3 - Diameter: 6 in. Depth: 100 ft

WELL PUMPING

The estimated yield of Well No. 1 is 70,000 gpd. Well No. 2 yield uncertain and Well No. 3 has a yield of 140,000 gpd.

The dug wells are pumped with a 2.0 and 3.0 hp vertical turbine pump with a capacity of 45 gpm. There are two submersible pumps in the drilled well, a 2 hp pump at 80 ft depth and a 1 hp pump at 75 ft depth.

TREATMENT

DESCRIPTION

The supply is chlorinated with a hypochlorinator. One machine is operating and one is a standby.

REMARKS

The pump shed is located above Well No. 2 and it is in fairly good condition. Well No. 1 is blasted out of rock and a reinforced concrete wall was built around the well with a tar shingle covered roof.

TRANSMISSION AND DISTRIBUTION

GENERAL

All pipes are looped; there are no dead ends. There is 2,100 ft of wrought iron 3 in. pipe from the well to the loop and 5,800 ft of 2 i copper line.

Approximately 600 ft of 1 1/2 in. and 3/4 in. plastic pipes complete the system. There are four valves at the street intersections.

PRESSURES

Minimum pressure in the system is 18 psi at the highest service; maximum pressure is about 55 psi.

CONDITION OF SYSTEM

Breaks occur occasionally.

STORAGE FACILITIES

LOCATION

At well sites.

CAPACITY AND TYPE

Well No. 1 can be considered as a storage tank. The volume of this dug well is estimated to be over 400,000 gal. There is a 2,500 gal pressure tank at Well No. 2.

CONTROL

The pumps start automatically, actuated by pressure drop.

OPERATION OF SYSTEM

Normally drilled Well No. 3 is pumped into the storage tank and directly into the system. In case the discharge decreases and drought is expected, the well is pumped continuously to recharge dug Well No. 1 which serves as a reservoir.

WATER QUALITY

Samples taken from the wells showed the following characteristics:

Color	0 - 2 units
pH	5.9-6.9
Nitrogen constituents	some
Total hardness	80 mg/l

Coliform organisms were present 1 out of 4 times with counts up to 10.

WATER RATES

Annual flat rate is $60, billed quarterly. There are no meters in the system with the exception of the main discharge meter.

MAINTENANCE

The system is maintained and operated by the owner.

BEST VIEW WATER COMPANY

GENERAL

The area served by this development is known as Best View and East Best View. This residential area is located just off the Scotch Cap Road and Route 32 intersection. The development consists of medium priced homes between 15 and 70 years old. The principal stockholder is Mr. M. Comstock of Quaker Hill, Connecticut.

The service area is flat with elevations ranging from 4 to 50 ft.

The population of the service area is approximately 220. There are 55 services in the development, none of which is metered. The system was originally constructed in 1901.

SOURCE OF SUPPLY

DESCRIPTION	The source of the supply consists of one dug well located southwest of Route 32 adjacent to Smith Cove. The well is 16 ft deep and 15 ft in diameter. The estimated safe yield of the well is 27,000 gpd.
WELL PUMPING	A 4 in. diameter piston pump rated at 25 gpm is used. There is a 4 in. positive displacement standby pump.
REMARKS	The well building is located 60 ft west of the pumphouse. The well structure is masonry, wood covered. The pumphouse is concrete, a 10 x 10 ft structure with the storage tank built in.

TREATMENT

The supply is chlorinated with a Wallace and Tiernan semi-automatic, electrically operated solution feed hypochlorinator, wired "On-Off" with well pump.

TRANSMISSION AND DISTRIBUTION

GENERAL	The entire system is served by 2 in. copper mains. Total length of pipes is 1.21 miles.
PRESSURES	Pressures in the system range from 45 to 65 psi.

STORAGE FACILITIES

LOCATION	At well site.
CAPACITY AND TYPE	1,800 gal pneumatic tank.
CONTROL	Automatic.

OPERATION OF SYSTEM

The positive displacement well pump delivers water into the pneumatic tank and also maintains pressure in the tank. A small air compressor supplements pressure before the pump is actuated.

WATER QUALITY

Mixed samples taken from the system showed the following characteristics:

Color	0 - 5 units
Turbidity	0 - 1 units
pH	6.1 - 7.0
Nitrogen constituents	some
Chloride (Cl)	0 - 60.0 mg/l
Total hardness (as $CaCO_3$)	20 - 50 mg/l
Free of coliform bacteria	

WATER RATES

Flat rate charges are:	Single family dwelling	$50 per year
	Summer season only	32 per year
	Industrial consumption	140 per year

CITY OF NEW LONDON PUBLIC WATER SYSTEM

GENERAL

Presently all public water works facilities in the Town of Waterford are fully dependent on th New London facilities. Existing sources are scarcely adequate at present and cannot be made adequa to serve both New London and Waterford for more than a limited period. New additional pumping and transmission facilities are under construction which will alleviate existing shortcomings of the sy tem. Pressures are good and well maintained and the arterial system is fairly good. Distribution storage is ample.

ADMINISTRATION

The City has a municipally owned and operated water department. In Waterford some of the mains are owned by New London, some by Waterford and some by private interests. Regardless of ownership, all distribution mains are maintained and operated by New London, with the exception of Ridgewood Park. The entire system is administered by the Director of the New London Public Works Department and operated by the Superintendent for Water Supply for New London.

PLANT AND OPERATING DATA (1968)	UNIT	NEW LONDON	WATERFORD	TOTAL
Total water used in 1968	mil gal	1,584	95	1,679
Consumption - average day	mgd	4.34	0.26	4.60
Maximum day	mgd	5.56	0.33	5.89
Date of occurrence		8/6/68	8/6/68	
Approximate distribution of water consumption*	Domestic %			45
	Industrial and Commercial %			26
	Other %			14
	Unaccounted %			15
Number of services	each	6,737	681	7,418
Number of services metered	each	6,737	681	7,418
Estimated population served		32,000	2,910**	34,910
% of Total		91.7	8.3	100
All inclusive consumption	gpd/cap	144	90**	132
Estimated domestic consumption (deduct industrial, commercial and other)	gpd/cap			59
Largest individual consumers	mgd			
		New London Mills		0.19
		State Pier (Connecticut Terminal Company)		0.11
		U.S. Naval Underwater Sound Laboratory		0.12
		U.S. Coast Guard Academy		0.11
		Connecticut College		0.11
Peak factor:	Maximum month ÷ average month			1.15
Peak factor:	Maximum day ÷ average day			1.28

SOURCE OF SUPPLY

Presently the City of New London and the Town of Waterford derive their water from four drainage collection areas with water storage reservoirs which are interconnected by pipelines. The secondary

* Percent distribution is based on dollars billed to consumers and thus it is not true quantitatively.

** Includes 60 in Montville.

reservoirs are Fairy Lake, Barnes Reservoir, and Bogue Brook Reservoir, all water from these finally reaching Lake Konomoc, the terminal reservoir, by gravity flow supplemented at times by a booster pump. A temporary pumping station was installed during the drought in 1966 to deliver the yield of Beckwith Pond into this system. A diagram of the system is shown on Plate No. 15.

Bond Reservoir

LOCATION	Located in the Town of Salem, 10.5 miles northwest of the principal business district of New London, on a tributary of East Branch, a stream which flows into Eight Mile River.
SAFE YIELD	0.2 mgd
QUALITY	Turbid, slightly colored.
YEAR COMPLETED	A channel was constructed in 1965 to deliver the runoff of Bond Reservoir into Fairy Lake. Later as a consequence of an appeal by the local farmers, the Court ordered the connection to be severed.

Fairy Lake

LOCATION	Located in the Town of Salem 10.5 miles northwest of the center of New London, on Latimer Brook, a tributary of the Niantic River.
SAFE YIELD	0.95 mgd
QUALITY	Turbid and slightly colored.
YEAR COMPLETED	1957
OPERATION, CONTROL	Discharges to an open channel which delivers the flow into Barnes Reservoir. All runoff collected above spillway elevation overflows into this channel; at times of dry periods discharge occurs by the manual opening of a valve placed in the discharge pipe embedded in the concrete dam.
DAM CONSTRUCTION	30' earth dam with concrete core and concrete facing.

Barnes Reservoir

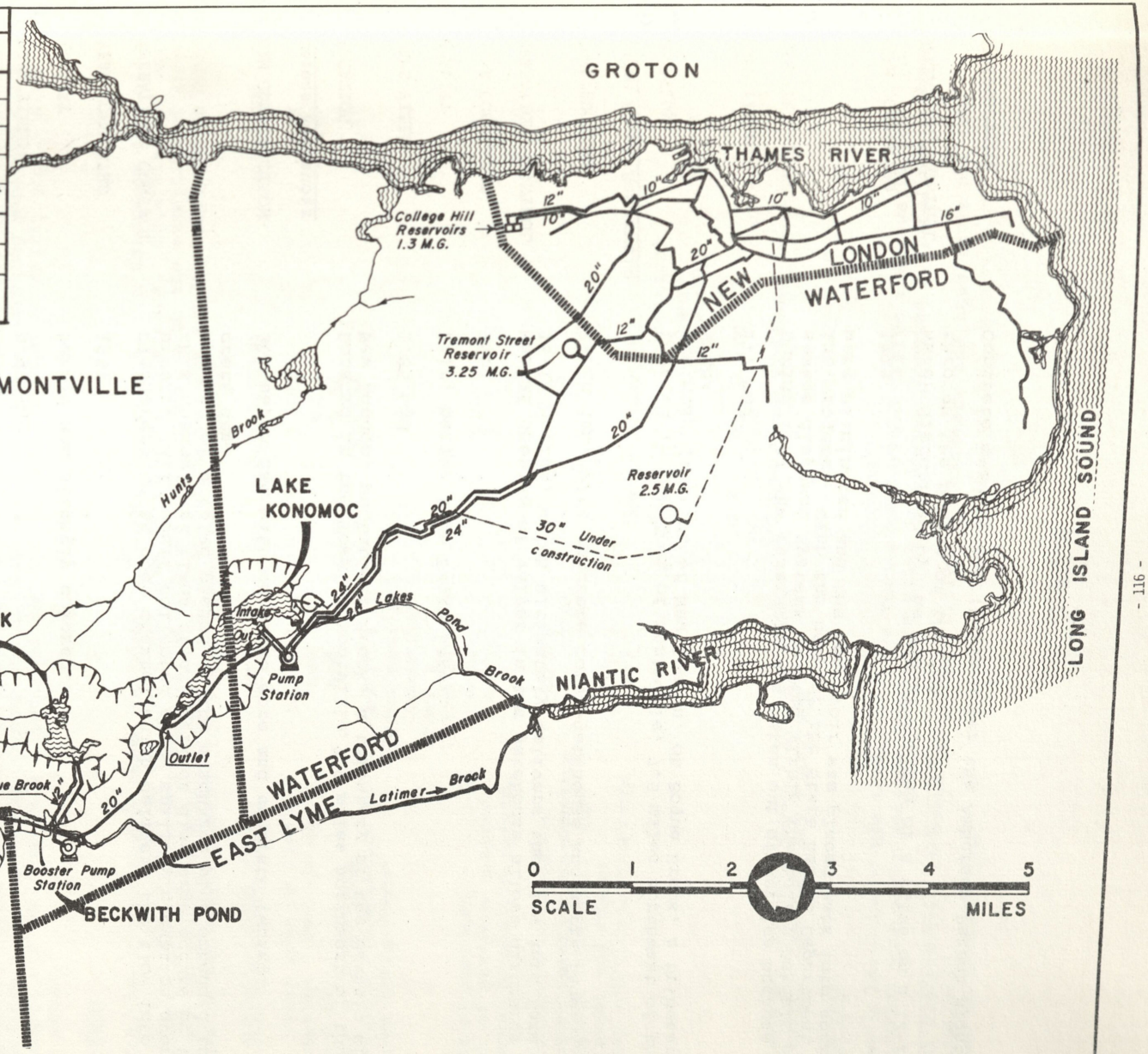
LOCATION	Located in the Town of Montville, 9.0 miles northwest of the center of New London, on Latimer Brook, a tributary of the Niantic River.
SAFE YIELD	1.85 mgd
QUALITY	Fair, better than Fairy Lake.
YEAR COMPLETED	1901
OPERATION, CONTROL	Manual opening of valves in the gatehouse allows discharge into the 16-inch pipe, which ultimately delivers the flow into Lake Konomoc.
CONSTRUCTION	Earth dam, with concrete core, gatehouse and earth face.

Bogue Brook Reservoir

LOCATION	Located in the Town of Montville, 7.5 miles northwest of the principal business district of New London, on Bogue Brook, a tributary of Latimer Brook.
SAFE YIELD	1.7 mgd
QUALITY	During 1967 the reservoir was taken out of service because of defective sewage disposal systems located within the nearby Oakdale Heights housing project. With the help of the State Health Department the hazards were eliminated and the reservoir was placed back into active service.
YEAR COMPLETED	1920
OPERATION, CONTROL	Water discharged by the manual opening of a valve on a 12-inch line through the bottom of the dam.
CONSTRUCTION	Concrete gravity dam (built under the Ambursen Patent Rights).

SOURCES OF WATER	DRAINAGE AREA SQ.MI.	TOTAL STORAGE MG.	YIELD mgd
BOND RESERVOIR (discontinued)	(0.5)	(60)	—
FAIRY LAKE	0.8	235	0.95
BARNES RESERVOIR	1.9	170	1.85
BOGUE BROOK RESERVOIR	2.0	212	1.70
BECKWITH POND	2.1	200	0.61*
LAKE KONOMOC	1.4	664	1.34
TOTAL	8.2	1481	6.45

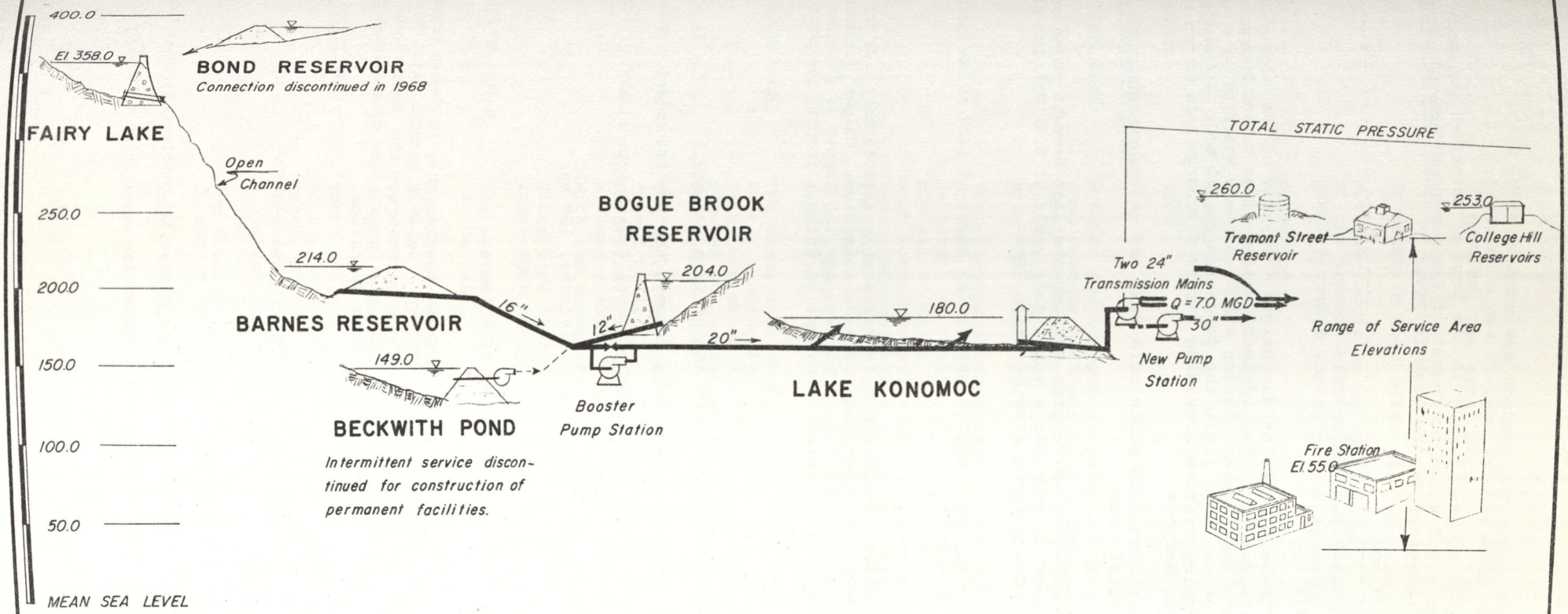
NOTE: At Lake Konomoc there is provision for chlorination and the addition of calgon. *1968 Pumped use



NEW LONDON WATER SUPPLY DIAGRAM

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 15



SCHEMATIC FLOW DIAGRAM.

NEW LONDON WATER SUPPLY

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 16

Lake Konomoc

LOCATION	It is located partly in the Town of Waterford and partly in Montville, about 6.5 miles northwest of New London center, on Lakes Pond Brook, a tributary of the Niantic River.
SAFE YIELD	1.34 mgd
QUALITY	Reasonably satisfactory.
YEAR COMPLETED	1872
OPERATION, CONTROL	A 20-inch pipeline discharges the yield of the other reservoirs into Lake Konomoc. Two 24-inch suction lines extend from the gatehouse into the pumping station which delivers water to the system. The two suction lines limit the discharge to 7.5 mgd. A recently constructed pumping station providing larger discharge rate has not yet been put into service.
CONSTRUCTION	Earth dam with stone core wall and gatehouse raising the level of a natural lake.
TOTAL SAFE YIELD OF SYSTEM	Compilation of records through the last drought period shows that the present system has a total safe yield of 6.45 mgd, including intermittent pumping from Beckwith Pond.
OTHER WATER RIGHTS OWNED	The City owns approximately 107 acres of land at the Hunts Brook reservoir site.

TREATMENT

The quality of the water reaching Lake Konomoc is reasonably satisfactory. At the Lake Konomoc pumping station chlorine is injected into the system for disinfection, "Calgon" treatment is applied for corrosion control, caustic soda is added for pH control and the supply is fluoridated. Water is delivered from this pumping station for municipal consumption without further treatment.

PUMPING

Lake Konomoc Pumping Station

LOCATION	Near the southwestern end of Lake Konomoc.
FUNCTION	To pump water from Lake Konomoc through transmission system to City.
CAPACITY	4 horizontal centrifugal pumps, 2 each approximately 1,800 gpm and 2 each approximately 2,800 gpm
MANUFACTURER	2 Fairbanks Morse Diesel engines, 120 hp 2 Murphy Diesel engines
CONTROL	Manual
YEAR COMPLETED	1943
REMARKS	The combined pump capacity is considerably in excess of maximum daily consumption demands. However, the twin suction mains which deliver Lake Konomoc water to the pumps restrict the combined capacity to a rate of about 7.5 mgd. The station will be discontinued after the new pump station is put into operation.

New Lake Konomoc Pumping Station

LOCATION	Near the southwestern edge of Lake Konomoc.
CAPACITY	3 pumps, each 5,000 gpm
MANUFACTURER	Jacuzzi (electric)
CONTROL	Manual. Provisions made to change to remote control.
YEAR COMPLETED	Under construction. Scheduled for completion in 1969.

REMARKS — This station was constructed under the improvement program which also included a new 30-inch transmission main. After this station is put in service, the other station at Lake Konomoc will be discontinued.

Beckwith Road Booster Pumping Station

LOCATION — On Beckwith Road after the junction of the 12- and 16-inch pipelines.

FUNCTION — With the addition of Fairy Lake to the system, the hydraulic capacity of the transmission pipes had to be supplemented by pumping. The pumps increase capacity from upstream reservoirs to Lake Konomoc.

CAPACITY — 4,300 gpm

MANUFACTURER — Peerless Pump Company, electric motor

CONTROL — Manual

YEAR COMPLETED — 1965

TRANSMISSION AND DISTRIBUTION

TRANSMISSION MAINS — A water supply main 20-inch and 16-inch in size and about three miles long extends northwestwardly from Lake Konomoc to collect the water supply derived from the other four reservoirs. A 12-inch supply main enters the 16-inch portion of this line to deliver the yield of Bogue Brook Reservoir into the system.

The existing transmission mains which extend from Lake Konomoc pumping station to the City's distribution pipe system are 20-inch and 24-inch in size. The mains were installed originally as gravity operating supply mains extending from Lake Konomoc to the City and were designed for much less pressure than is now used. The present capacity of the system is approximately 5.8 mgd. Fire flows are dependent upon the storage on the distribution system; a break in either supply line would seriously affect domestic consumption and fire flows. When the daily consumption approaches 5.8 mgd, normal pressures cannot be maintained on College Hill.

DISTRIBUTION MAINS — The water distribution facilities include about 81 miles of water mains, ranging in sizes from 4 to 20 in. Generally, the water distribution mains in New London and Waterford are adequate and well planned to support growth. The gridiron is somewhat incomplete in outlying areas.

The Waterford system consists of ten miles of pipe ranging in size from 8 to 12 in. Some of the mains are owned by New London, some by Waterford, and some by private interests. Regardless of ownership, all water mains are presently maintained and operated by New London, with the exception of Ridgewood Park.

MATERIALS — Older pipe is tar coated cast iron; most new pipe is cement lined cast iron; some is asbestos cement.

CONDITION OF SYSTEM — The system is in fairly good condition; no serious problems have arisen in the past.

PRESSURES — Discharge pressure at the pumping station (Elev. 186) varies between 35 and 55 psi. At the business district due to the low elevations (Elev. 50) the pressure ranges between 90 and 100 psi. A minimum of 20 psi is maintained at the highest serviced area at Elev. 242 ft.

FIRE PROTECTION — There are 619 publicly owned and 116 private fire hydrants. The area covered by each hydrant in the principal mercantile district is approximately 65,000 sq ft and 180,000 sq ft in the residential area. The National Board of Fire Underwriters rating for New London and Waterford is 4B and 9E respectively.

VALVES — The average valve spacing in the principal mercantile district is 520 ft and in residential districts 675 ft.

EMERGENCY CONNECTIONS — There are no emergency connections to any other water system.

INVENTORY OF PIPES		DIAMETER IN INCHES	LENGTH IN FEET	% OF TOTAL
	Supply Pipes	30	1,350	1.2
		24	34,354	31.5
		20	54,839	50.3
		16	6,908	6.3
		12	9,619	8.8
		10	2,033	1.9
	Total		109,103	100.0
	Transmission and Distribution Pipes	18	362	0.1
		16	24,167	5.6
		12	40,298	9.4
		10	59,279	13.8
		8	49,717	11.6
		6	239,375	55.6
		4	13,236	3.1
		3/4 to 1 1/2	3,638	0.8
	Total		430,072	100.0

DISTRIBUTION STORAGE

TOTAL DISTRIBUTION STORAGE	9.55 mil gal

College Hill Reservoir

LOCATION	Northern end of New London.
TYPE	Concrete, square, open tank.
CAPACITY	1.3 mil gal in two cells (550,000 and 750,000 gal).
CONTROL	Telemeter signal level in reservoir is maintained by observation.
ELEVATION	Overflow level 253 ft.
YEAR COMPLETED	1900, first cell; 1930, second cell.
REMARKS	6 in. meter is installed at discharge pipe, chlorination is practiced.

Tremont Street Reservoir

LOCATION	On Two Mile Hill in Waterford near the New London City line between the two transmission lines.
TYPE	Pre-stressed concrete standpipe.
CAPACITY	3.25 mil gal.
CONTROL	Automatic double acting altitude valve.
ELEVATION	Overflow level 260 ft.
YEAR COMPLETED	1960

Manatuck Hill

LOCATION	On Manatuck Hill 2.5 miles west from City line along Boston Post Road.
TYPE	Pre-stressed concrete standpipe.
CAPACITY	5.0 mil gal.
CONTROL	Automatic double acting altitude valve.
ELEVATION	Overflow level 260 ft.
YEAR COMPLETED	Scheduled for completion in 1969.

OPERATION OF SYSTEM

The system is operated by pumping from the Lake Konomoc pumping station. During normal day operating conditions two pumps deliver water to the system at approximately 6.3 mgd rate. The pumps are operated by manual control, with observance of the pressure in the system.

WATER QUALITY

Samples taken at the Lake Konomoc Pumping Station showed the following characteristics:

Coliform group	found 3 times out of 50 samples
Color	8 units
Odor	Chlorinous (slightly)
Turbidity	1 unit
pH	7.2
Alkalinity (Bicarbonate) (as $CaCO_3$)	1.0 mg/l
Total hardness (as $CaCO_3$)	30 mg/l
Fluorides	0.95 mg/l
Free chlorine residual	0.2 mg/l

SERVICE RATES AND CHARGES

		New London	Waterford
MINIMUM CHARGE PER YEAR			
	5/8 in. connection	$ 15.60	$ 19.40
	2 in. connection	94.00	116.00
	6 in. connection	500.00	628.00
SEMI-YEARLY BILLING	Step rate system per 1,000 gal	52¢ to 24¢	65¢ to 30¢

MAINTENANCE PROGRAMS

Hydrant inspection and flow tests annually.
Meter repairing and inspection. 1,200 repairs during 1968.
Leakage survey. Completed in 1968.
Line flushing. Annually.
Valve inspection. Not done in recent years.

FUTURE PLANNING

An improvement program was started in 1967, which consists of the following items:

1. Cleaning and cement lining the 16-inch and 20-inch water supply mains between Barnes Reservoir and Lake Konomoc.
2. Acquisition of Beckwith Pond and construction of a new dam and pumping facilities at Beckwith Pond.
3. Raising the present dam at Lake Konomoc and constructing a new pumping station.
4. Construction of a 5 mg reservoir in Waterford.
5. Construct 7.5 miles of 30-inch and 24-inch new transmission mains.
6. Construct new 16-inch feeder mains.
7. Waterford plans during 1969 and 1970 the construction of 30 miles of transmission and distribution piping.
8. Construction of a 3.5 mg tank at Connecticut College.

ENGINEERING STUDIES AND REFERENCES

1. Surface Water Supplies Available in Southeastern Connecticut. Metcalf and Eddy, April, 1962.
2. Report on Water Works System for Municipalities of New London and Waterford. Fay, Spofford and Thorndike, April, 1966.
3. Report on New London, Connecticut. File No. 343, National Board of Fire Underwriters, February, 1961.
4. Water Supply System for Waterford. Hayden and Harding, February, 1964.

5. "Town of Waterford, Connecticut, Report on Test Well Program - Jordan Brook Area." Hayden and Harding, August, 1965.

6. "57th Annual Report of the Public Utilities Commission." State of Connecticut.

7. Annual Report of the City of New London for the Year 1968 to the Public Utilities Commission of the State of Connecticut.

MILLSTONE POINT CLUB

GENERAL

The Millstone Point Coub is a housing development consisting of 70 medium to high priced homes. The area involved is located immediately east of the Nuclear Power Station.

The water system is owned and operated by Henry Gardiner of Waterford.

There are 70 individual residences served by this system and the estimated population is 240. Summer population is considerably higher. The average lot size is 13,000 sq ft. There are 34 lots on which houses are not built yet; however, some of these belong to neighboring property owners with no intentions for additional construction.

SOURCE OF SUPPLY

DESCRIPTION	The source of supply consists of two dug wells. Well No. 1 - Diameter: 30 in. Depth: 20 ft Well No. 2 - Diameter: 30 in. Depth: 20 ft Both wells have concrete casings and steel covers.
WELL PUMPING	There are nine different small pumps of varying capacities, two of which are hooked up and working at a time, according to the demand.
REMARKS	Well No. 1 is housed in a concrete block structure. Well No. 2 is in a wood frame structure.

TREATMENT

The supply is chlorinated.

PUMPING

GENERAL	One of the two active pumps for Well No. 1 delivers water directly into the pressure tank, the other into the system.

TRANSMISSION AND DISTRIBUTION

GENERAL	Distribution system consists of cement-lined cast iron pipe.
CONDITION OF SYSTEM	Satisfactory; but according to the Waterford Water Department, the pipes are laid too close to the surface.
PRESSURES	The average pressure in the system is 35 psi.
FIRE PROTECTION	There are no fire hydrants in the system.

STORAGE FACILITIES

There is one 5,000 gal pressure tank in the pump pit for Well No. 1.

WATER QUALITY

Color	0 - 17 units
Odor, description	Earthy at times
Turbidity	1 - 20 units
pH	5.8 - 6.7
Nitrogen constituents	Considerable
Total hardness (as $CaCO_3$)	30 mg/l
Iron	0 - 2.0 mg/l
Manganese	0 - 0.08 mg/l

Coliform colonies were found in Well No. 1; however, this problem was resolved by chlorination.

SERVICE RATES AND CHARGES

$48 per year flat rate.

MAINTENANCE

The system is maintained by the owner. There are no provisions for flushing.

RIDGEWOOD PARK COMPANY

GENERAL

Ridgewood Park is located east of the New London city line in Waterford along Alewife Cove on Great Neck peninsula. Elevations range from sea level to 40 ft. The system is supplied by the New London Public Water System. It was constructed in 1920. There are approximately 135 homes in the area. There is a master meter, but the services are not metered and a flat rate of $60 is charged. There are 5 hydrants in the system. The mains are 6 in. cast iron.

The distribution system consists of 3,140 ft of 6 in. cast iron pipe, 1,839 ft of 4 in. steel pipe and 6,103 ft of steel, galvanized iron and cast iron smaller pipe. The total length of the gridiron is 11,082 ft.

WATERFORD VILLAGE

GENERAL

The development known as Waterford Village is located on Latimer Hill north of Route 1 and east of the Vauxhall Street and Douglas Lane intersection. The utility is fully owned by the Waterford Village Corporation, of which Harold Grabow is the president.

The service area covers Latimer Hill; elevations range from 250 to 312 ft.

Presently there are 40 homes connected; however, the system is planned for an ultimate development of 100 houses.

SOURCE OF SUPPLY

DESCRIPTION — The source of the supply consists of three drilled wells.

Well No. 1 - Diameter: 6 in. Depth: 300 ft
Well No. 2 - Diameter: 6 in. Depth: 400 ft
Well No. 3 - Diameter: 6 in. Depth: 325 ft

Capacity is approximately 35 gpm per well.

WELL PUMPING — The estimated safe yield of the system is 75,600 gpd. All wells are pumped by submersible pumps having capacities of 22, 22 and 30 gpm, respectively.

EMERGENCY — There is no emergency power source for the wells.

TREATMENT

The supply is untreated.

PUMPING

There are 3 high pressure horizontal centrifugal pumps each having a capacity of 35 gpm and a head of 210 ft. An auxiliary gasoline driven pump is installed for emergency conditions.

TRANSMISSION AND DISTRIBUTION

GENERAL — The distribution system consists of 6 in. and 4 in. cast iron pipes. The system is presently under development and additional pipes are being laid.

PRESSURES	The pressures, according to geographical location, vary between 60 and 80 psi.
FIRE PROTECTION	There are 5 hydrants in the system.

STORAGE FACILITIES

Main Storage

LOCATION	At pumphouse.
CAPACITY AND TYPE	30,000 gal steel tank.
CONTROL	Automatic pressure and level controls.

Supplementary Tanks

LOCATION	Same location.
CAPACITY AND TYPE	Two 2,500 gal pressure tanks.
CONTROL	Automatic control. A small air compressor supplements air pressure.

OPERATION OF SYSTEM

It is an automatic system; pressure or level drop in the system actuates the high pressure pumps and water level in the storage tank controls the well pumps. Two pumps work simultaneously, and the third is on standby position.

WATER QUALITY

Color	0 - 3 units
Odor	Occasionally musty
Turbidity	0 - 1 units
pH	6.8 - 7.7

All other qualities were satisfactory.

WATER RATES

All services are metered.

MAINTENANCE

Day to day operation is by a construction worker on a part time basis. Maintenance and repairs are accomplished by an outside contractor.

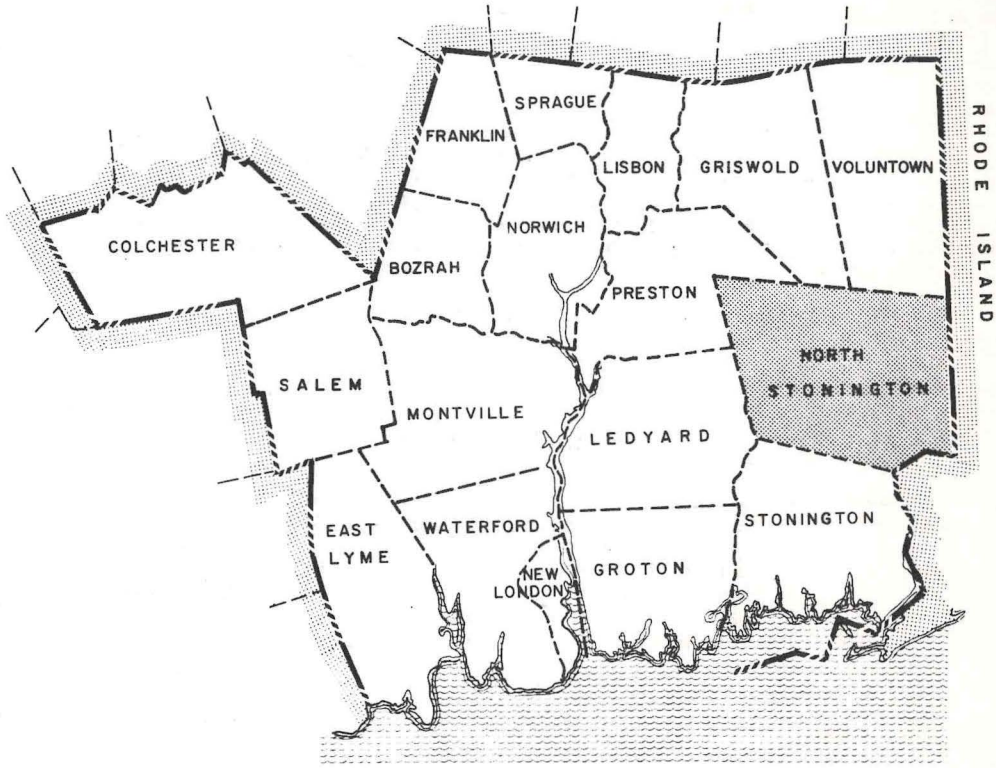
REMARKS

The pumps, storage tanks and controls are located in a neat 18 ft by 18 ft concrete block building. The mechanical condition of the system is good and the building impressive.

REFERENCES

Groton Plumbing Supply Company engineered the system.

NO. STONINGTON



GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

North Stonington has an area of 55.6 square miles and is the largest town in Southeastern Connecticut. Located along the eastern border of the Region, it has elevations ranging from about 50 feet to almost 550 feet. Generally, relief averages about 250 feet, although numerous exceptions to this average exist. Although it contains numerous hills, North Stonington has several broad areas of level or gently sloping land in widely scattered parts of the town.

TRANSPORTATION

Freight service to North Stonington is available from numerous trucking concerns. The town has good access to Interstate Route 95 which passes through the southeastern corner of the town. In addition, the town is served by State Routes 2, 49, 184, and 201.

INSTITUTIONS AND INDUSTRY

There are no major institutions in the town and the only existing major industry manufactures valves. There are no commercial activities of major proportion in the town.

GOVERNMENT

North Stonington's government includes a board of selectmen, town meeting, and a board of finance.

POPULATION

The current estimated population of 3,500 contrasts considerably with the 1960 figure of 1,982 persons. Most of North Stonington's population is found in the southern part of the town with the remainder being thinly scattered over the northern portion.

WATER SYSTEMS

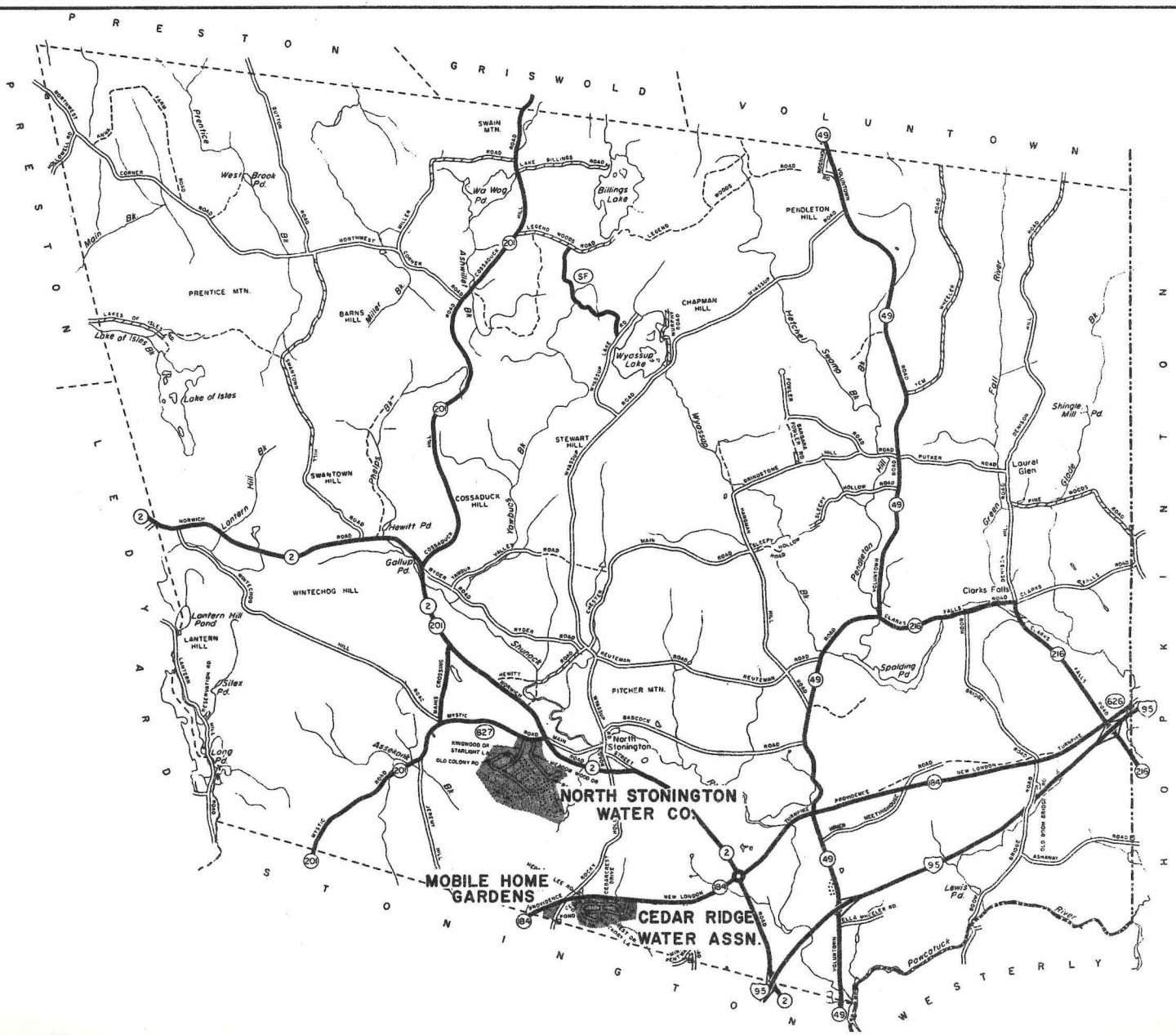
The Town of North Stonington does not own any water works facilities. There is one investor owned water company, one system is owned by a homeowners' association, and there is a privately owned mobile home park equipped with a small system. Other residential, commercial and institutional consumers depend on private individual sources.

The areas served by the above mentioned systems are shown on Plate No. 17.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	302
Population served	1,117
Average output	63,000 gpd
Individual Wells	
Number of wells*	670
Population served	2,283
Average output	137,000 gpd
TOTAL	
Number of consumers	972
Population served	3,400
Average output*	200,000 gpd

* Estimated



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SCALE MILES

TOWN OF NORTH STONINGTON

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 17

CEDAR RIDGE WATER ASSOCIATION

GENERAL

The Cedar Ridge Water Association, a homeowners' association, operates a water utility for the Cedar Ridge Development. This medium density community of medium priced homes is located just north of the Stonington Town Line on the south side of Route 184. It is entered via Cedarcrest Drive. Topography of the area is slightly sloping, elevations range from 105 to 140 ft. The system was constructed in 1958. There are 124 services; the estimated population is 437. Estimated average daily water consumption is 28,500 gal.

SOURCE OF SUPPLY

DESCRIPTION	The source of supply is a 30 ft deep, gravel packed, 8 in. diameter well, yielding 200 gpm. The well is located approximately 150 ft south of the intersection of Pond Road and Forest Road.
WELL PUMPING	Three Deming horizontal centrifugal pumps are installed, each having a capacity of 66 gpm, with a 5 hp motor. The three pumps are parallel, all taking suction on the same well and all operating simultaneously. Any of the pumps can be taken off the system at any time.
REMARKS	The well pit is very damp. There is a sump pump which operates on level control.

TREATMENT

The supply is untreated.

TRANSMISSION AND DISTRIBUTION

GENERAL	The system consists of all cast iron pipes, all looped with the exception of a short dead-end line. There are a few shut-off valves at the intersections. Three fire hydrants are installed which can be used for flushing; otherwise, in the absence of storage, they provide little use. There are no meters in the system.	
MATERIALS AND LENGTH	6 in. cast iron pipes	440 ft
	4 in cast iron pipes	6,680 ft
	Total length	7,120 ft or 1.35 miles
PRESSURES	The pumps are set on 44 psi to start and 58 psi to stop; however, depending on location, system pressures range between 22 and 45 psi.	

STORAGE FACILITIES

LOCATION	At pump house.
CAPACITY AND TYPE	3,500 gal steel pressure tank.
CONTROL	Automatic pressure control.

OPERATION OF SYSTEM

DESCRIPTION	The system is an automatic hydro-pneumatic system. The pumps are started by a pressure switch set at 44 and 58 psi. All three pumps start simultaneously. A small air compressor is installed in the system.

WATER QUALITY

Samples taken by the State Health Department showed traces of color; the pH was below 5.9.

WATER RATES

A flat rate of $3.00 is charged per month.

MAINTENANCE

The system is maintained and operated by the association; in case of extensive maintenance or repair, contractors are called in.

REFERENCES

The system was engineered by Aetna Engineering Company.

NORTH STONINGTON WATER COMPANY

GENERAL

This water company serves the adjacent developments of Meadow Wood and Kingswood Park, located just off Route 2 about 2 miles north of the intersection of Routes 2 and 184. The water company is a partnership. The system originated in 1963.

The residences are 150 medium income houses, one apartment building and one garage. Plans call for 110 additional homes to be built by the end of 1971. The topography of the development is flat, with a mean elevation of about 200 ft.

Presently there are 153 services, of which 141 are metered. Estimated population is 600, daily average water consumption 30,000 gal.

SOURCE OF SUPPLY

DESCRIPTION	The source of supply is located about 1 1/2 miles north of the development, to the northeast of Route 2. It is entered via a utility road just northwest of the Dew Drop Inn. The source is a 250 gpm gravel packed well, 38 ft deep, 24 in. outside diameter, 12 in. inside diameter with a screen at 35 ft. The well site and some adjacent land is leased for 99 years.
WELL PUMPING	The well is pumped with a Deming vertical turbine pump driven by a 15 hp motor. The pump discharges directly into the pressure tank.
REMARKS	The pumphouse is built of concrete blocks and has a shingle roof.

TREATMENT

DESCRIPTION	The supply is chlorinated. Chlorine solution is injected from a plastic barrel with a Wallace and Tiernan hypochlorinator.

TRANSMISSION AND DISTRIBUTION

GENERAL	The system consists of 6 and 8 in. cast iron pipelines, mostly looped, with valves located at the intersections.	
MATERIALS AND LENGTHS	8 in. cast iron	6,300 ft
	6 in. cast iron	12,765 ft
	Total length	19,065 ft or 3.6 miles
PRESSURES	The system operates at 50 psi, providing 40 psi at the highest service.	

STORAGE FACILITIES

At the pump house a 10,000 gal pressure tank is installed partially in the wall of the structure. Another 10,000 gal storage tank is in place but not in use. The system is controlled by pressure switches.

WATER QUALITY

The development was originally supplied by a 150 gpm artesian well. However, the water of this well was very hard. A Hungerford and Terry manufactured softener was installed. The present supply, sampled by the State Health Department, showed a pH of 6.2-6.5. The water was of good quality, with only 9 mg/l hardness.

WATER RATES

Basic quarterly 5/8 in. service is $6.50, including the first 4,000 gal. Then a step rate system, from 80¢ per 1,000 gal to 50¢ per 1,000 gal, is used.

MAINTENANCE

Maintenance and operation is done by the personnel of the South Windsor Construction Company.

The Company sometimes mails billing cards to the customers to have them read their own meters and return the readings to the company.

MOBILE HOME GARDENS

This mobile home park is located just north of the Stonington Town Line on the south side of Route 184, between the Cedar Ridge Development and the Town Line. Topography of the area is slightly sloping, elevations ranging from 120 to 130 ft. The system was installed in 1959. There are 25 mobile home lots, and the total area of the park is 7 acres. Estimated population is 80, and average daily water consumption 5,000 gal.

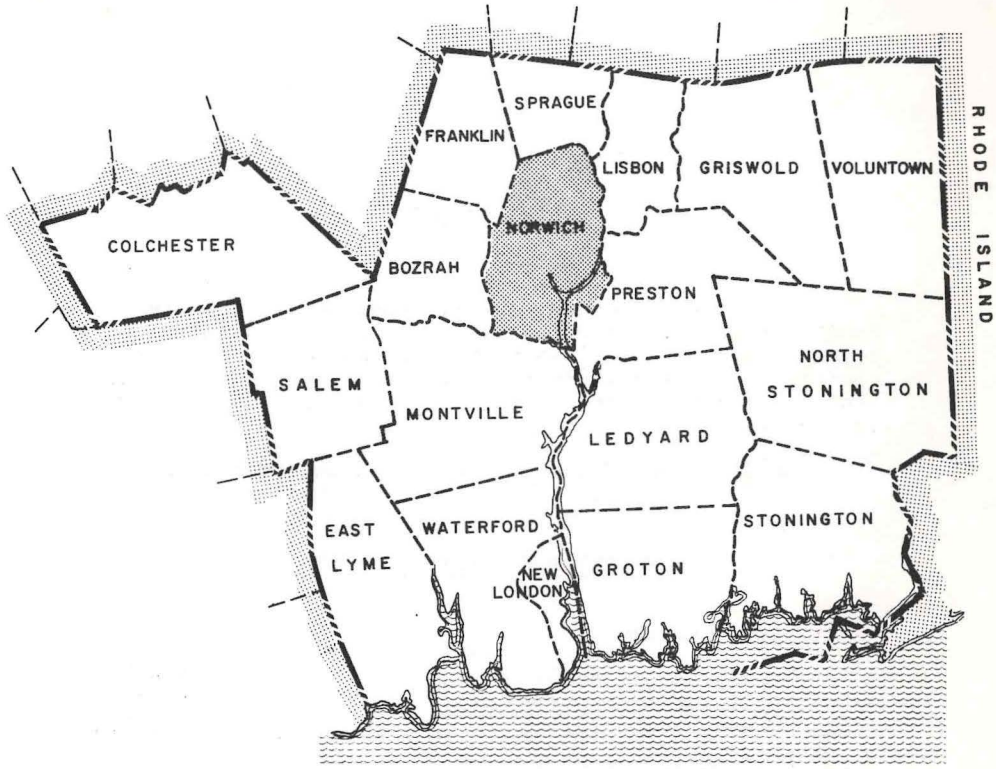
The source of supply consists of three wells:

Well No. 1: 6 in. diameter drilled well, 250 ft deep, yield 12 gpm
Well No. 2: 6 in. diameter drilled well, 195 ft deep, yield 10 gpm
Well No. 3: dug well 15 ft deep

A 1.5 hp submersible pump is installed in well No. 1 having a capacity of 100 gpm; a similar pump is installed in Well No. 2, and No. 3 well is pumped with a centrifugal pump only during emergency conditions. The system is hydro-pneumatic. At 30 psi pressure, pump No. 1 will start; if pressure further drops to 25 psi pump No. 2 will automatically start. There is a 550 gal pressure tank at Well No. 1, a 120 gal pressure tank at Well No. 2.

The distribution system consists of 2 in. looped plastic pipes; valves are located at the intersections. There are 5 shut-off valves. Service lines are copper. All pipes are laid with 4 ft cover. Pressure in the system ranges between 25 and 40 psi. There are no meters. Water service is included in the rental fees.

NORWICH



GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Norwich comprises 29.3 square miles and is located at the confluence of the Yantic and Shetucket Rivers. The topography varies considerably and includes narrow stream valleys, rolling hills, and bedrock outcroppings. Maximum relief between adjacent hilltops and valleys is about 200 feet and elevations range from near sea level along the rivers to about 500 feet in the northern part of the town.

TRANSPORTATION

Major highways serving Norwich are the Connecticut Turnpike and State Routes 2, 82, 32, 97, 165, and 12. Freight service is offered by numerous truck companies. Passenger and freight railroad and bus services are also available. Shallow draft ocean vessels serve a limited number of oil storage firms along the Thames River in Norwich.

INSTITUTIONS AND INDUSTRY

Major institutions include two major state hospitals and a local hospital, and two state technical schools. Manufacturing products include vacuum bottles, textiles, cartons, plastics, shoes, clothing, and plumbing equipment. Norwich also serves as a major sub-regional commercial center.

GOVERNMENT

Norwich has a city manager-council form of government.

POPULATION

Major population concentrations are found adjacent to the commercial center of the city and along the banks of the Yantic, Shetucket, and Thames Rivers. Scattered subdivisions and limited farming can be found in the outlying sections of the town. The 1960 population was 38,506 and the present estimated population is 41,900.

WATER SYSTEMS

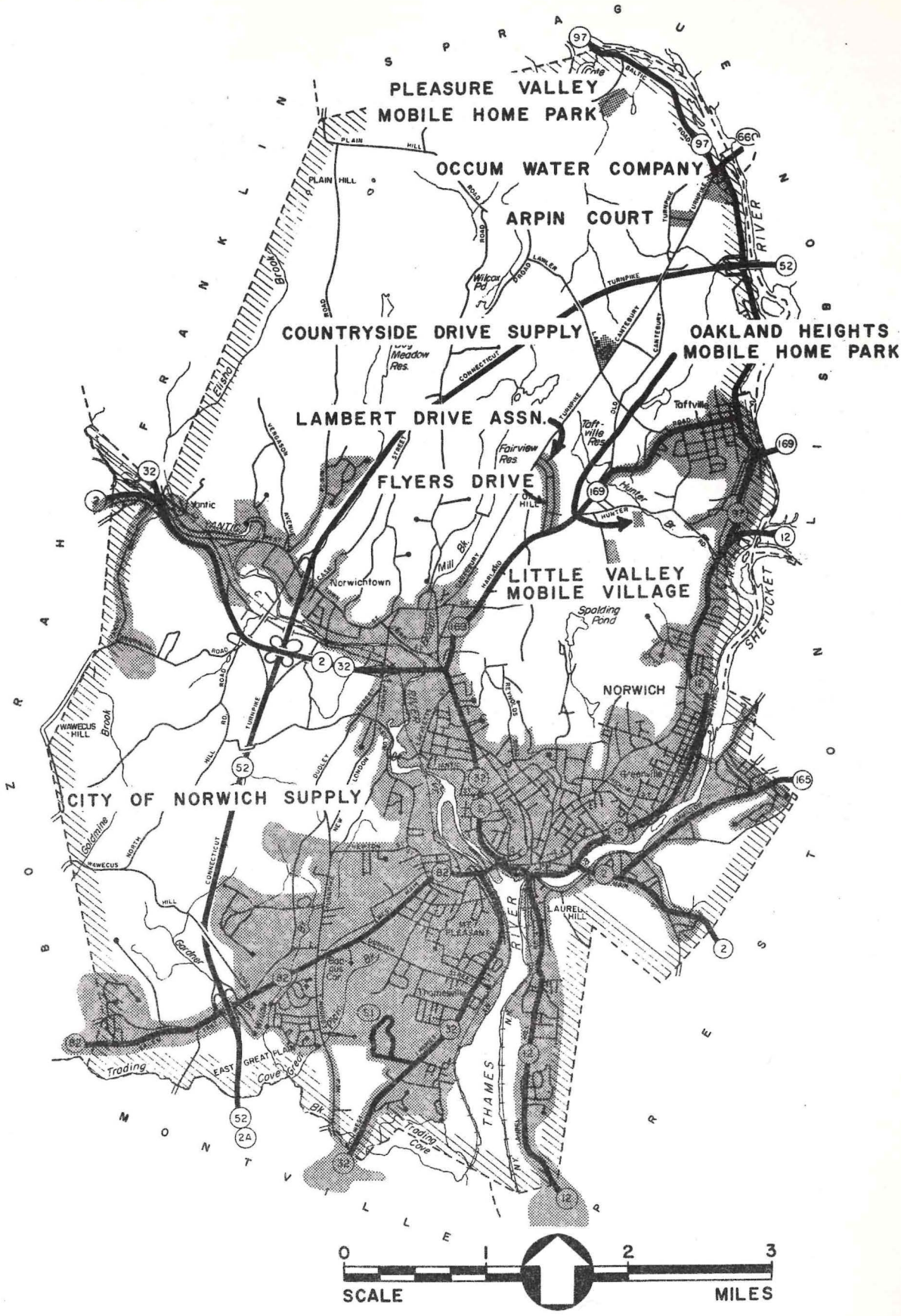
In Norwich, the municipally owned system supplies water to 90 percent of the population. In addition, there are seven small privately owned systems and one homeowners association. A relatively small group of people, mostly at higher elevations and at outlying areas, depend on individual wells.

The location of the service areas is shown on Plate No. 18.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	8,636
Population served	40,055
Average output	5,020,000 gpd
Individual Wells - Domestic	
Number of wells*	570
Population served	1,945
Average output*	120,000 gpd
TOTAL	
Number of consumers*	9,206
Population served	42,000
Average output*	5,140,000 gpd

* Estimated



TOWN OF NORWICH

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 18

ARPIN COURT

This small community supply, installed in 1950, serves houses on Annadel Road and one service on Old Canterbury Turnpike. It is owned and operated by the Trask Well Company. The area is located just north of the Connecticut Turnpike connecting the Old Canterbury Turnpike with Canterbury Turnpike. The area is slightly sloping at El 150. There are 13 homes connected to the system. Estimated population is 45, and average daily water consumption is 2,700 gal.

The source of supply is a 6 in. drilled well located at the intersection of Old Canterbury Turnpike and Annadel Road. The well has a safe yield of approximately 12 gpm. A horizontal centrifugal 3 hp pump is installed in a 15 ft by 10 ft concrete pit located adjacent to the well. It is a hydropneumatic system with a 700 gal steel tank. Two reserve tanks are located in the pit but not connected to the system. The pump operates on pressure switches set at 40 and 60 psi. There is no air compressor, treatment or other equipment in the pit.

The distribution system consists of a single 3 in. wrought iron pipe laid in Annadel Road. The service connections are 3/4 in. copper. Curb boxes are installed at each connection. The system does not have meters or main valves. Pressure in the system ranges between 40 and 60 psi with the exception of the house on Old Canterbury Turnpike which is located at a higher elevation. Annual charges are $25, billed twice a year.

CITY OF NORWICH PUBLIC SUPPLY

SUMMARY

The City of Norwich is supplied with water by a system of surface water reservoirs which has provided a water supply adequate in quantity but low in quality.

Plans are presently in progress to implement a program designed to improve the quality and also increase the quantity of supply.

ADMINISTRATION

The City has a municipally owned and operated system. Water is supplied by the Water Division of the Norwich Department of Public Utilities which is supervised by a general manager and operated by the superintendent for water supply.

PLANT AND OPERATING DATA

AVERAGE DAILY PRODUCTION	4.95 mgd.
TOTAL WATER USED IN 1968	1,806 mil gal.
MAXIMUM DAILY DEMAND	6.58 mil gal on July 10, 1968.
DISTRIBUTION OF WATER PRODUCTION	40% domestic and commercial. 12% institutional. 10% industrial. 38% other.
NUMBER OF SERVICES	8,182.
NUMBER OF SERVICES METERED	8,059 or 98.5% of total.
ESTIMATED POPULATION SERVED	38,800 or 92% of total.
TOTAL PER CAPITA CONSUMPTION	128 gpd.
ESTIMATED PER CAPITA DOMESTIC CONSUMPTION	51 gpd.

LARGEST INDIVIDUAL CONSUMERS	Norwich State Hospital, 0.5 mgd. Thermos Company, Thermos Avenue, 0.16 mgd. Norwich Gas & Electric, 0.13 mgd. Thermos Company, Jewett City Road, 0.11 mgd.
RATIO OF MAXIMUM MONTHLY DEMAND TO AVERAGE MONTHLY DEMAND DURING 7 YEARS	1.11 - 1.43.

SOURCES OF SUPPLY

Presently the City of Norwich derives its water from three major and two minor surface impounding reservoirs. The major reservoirs are Deep River, Stony Brook and Fairview, and the minor ones are the Ponemah reservoirs located in Taftville. A diagram of the system is shown on a graphic presentation on Plate No. 19.

Deep River Reservoir

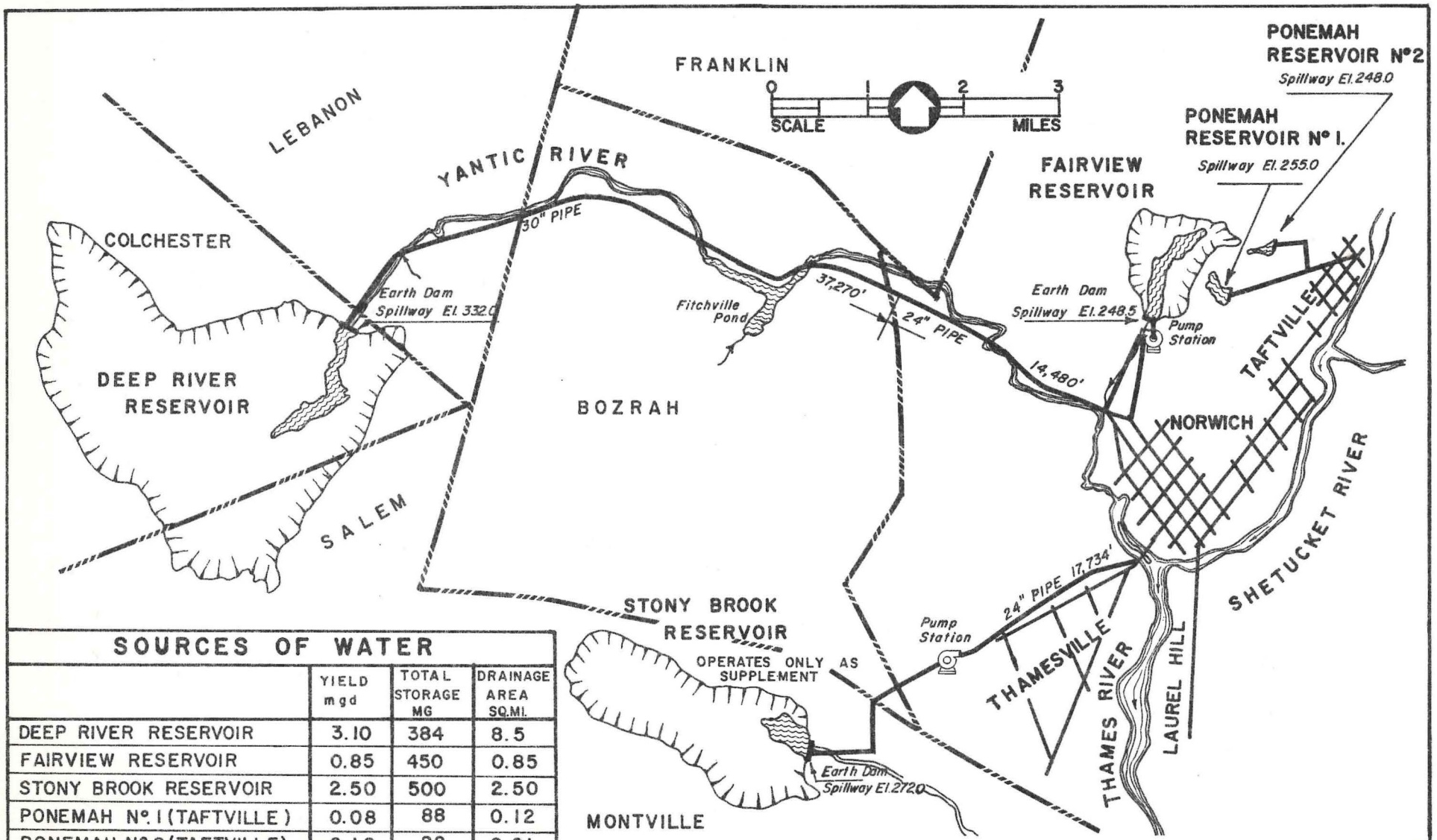
LOCATION	7 miles west of the City in the Town of Colchester on Deep River, a tributary of the Yantic River.
SAFE YIELD	3.1 mgd.
QUALITY	High iron and manganese content, corrosive, taste and odor problems.
CONSTRUCTION	Earthen dam with paved upstream slope, concrete core wall and concrete spillway.
YEAR COMPLETED	1929.
OPERATION - CONTROL	A reinforced concrete gatehouse with a screen chamber located on the upstream slope of the dam and having three portals, the lowest at El 301. Supply flows by gravity.
REMARKS	The Deep River Reservoir was designed and constructed to allow for an increase of 18 ft in height to flow line El 350. At this elevation the storage capacity would be increased to an estimated 1,450 mil gal.

Stony Brook Reservoir

LOCATION	In the Town of Montville on Stony Brook, a tributary of the Thames River about one mile southwest of the Norwich city limits.
SAFE YIELD	2.5 mgd.
QUALITY	Slightly turbid, high in color, containing excessive iron and manganese. At certain periods noticeable taste and odor.
CONSTRUCTION	Formed by two earthen dams with paved upstream slopes and concrete core walls.
YEAR COMPLETED	1911-12; enlarged in 1914.
OPERATION - CONTROL	A gatehouse which contains a screen chamber is located near the upstream slope of the dam. It has three intake portals with the lowest at El 240. Two 24 in. cast iron mains extend under the dam, one serving as a drain. Water can flow by gravity, but pressure is boosted intermittently, during periods of high demand.

Fairview Reservoir

LOCATION	In the Town of Norwich on a tributary of the Yantic River about two miles north of the center of the City.
SAFE YIELD	0.85 mgd.
QUALITY	This reservoir has the best quality of the Norwich supplies. Slightly turbid, slight color, presence of taste infrequent, faint vegetable odor is frequent, less iron content than at Stony Brook and Deep River Reservoirs.
CONSTRUCTION	Earthen dam with a masonry core wall. The dam was raised 3 ft.



SOURCES OF WATER

	YIELD mgd	TOTAL STORAGE MG	DRAINAGE AREA SQ.MI.
DEEP RIVER RESERVOIR	3.10	384	8.5
FAIRVIEW RESERVOIR	0.85	450	0.85
STONY BROOK RESERVOIR	2.50	500	2.50
PONEMAH Nº. I (TAFTVILLE)	0.08	88	0.12
PONEMAH Nº. 2 (TAFTVILLE)	0.12	22	0.21
TOTAL	6.65	1444	12.18

NOTE: CHLORINE INJECTED INTO ALL TRANSMISSION LINES
RESERVOIRS TREATED WITH COPPER SULFATE
DEEP RIVER RESERVOIR AERATED

NORWICH WATER SUPPLY DIAGRAM

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 19

YEAR COMPLETED	This is the original supply of the City, built in 1868, and the dam was raised in 1902.
OPERATION - CONTROL	Intake structure on the upstream slope of the dam. Water can flow by gravity, but pressure is boosted intermittently as required.

Ponemah Reservoir No. 1

LOCATION	In Taftville in the Town of Norwich on a tributary of the Shetucket River about 2 1/2 miles north of the center of the City.
SAFE YIELD	125,000 gpd.
QUALITY	Slightly turbid, high in color and iron. At times objectionable taste and odor.
OPERATION - CONTROL	Supply is by gravity through a 12 in. main line.
REMARKS	Formerly a private system.

Ponemah Reservoirs No. 2 and No. 3

LOCATION	In Taftville in the Town of Norwich on a tributary of the Shetucket River about 2 miles north of the center of the City.
SAFE YIELD	75,000 gpd.
QUALITY	Slightly turbid, high in color and iron content, at times noticeable odor and taste.
OPERATION - CONTROL	Gravity flow to Taftville through a 12 in. main. When Stony Brook pumping station is in operation, backflow into this reservoir sometimes occurs.
REMARKS	Formerly a private system.

Private Auxiliary Water Sources

GENERAL	Norwich Hospital has two 450 gpm shallow wells on its property. The chloride content in these wells is high. One is used for lawn sprinkling only; the other supplements the potable water supply.

TREATMENT

The treatment of the Norwich water supply consists of disinfection by chlorination at the outlet of each reservoir and in the pumping stations. Copper sulfate is intermittently applied to the reservoirs for the control of microscopic organisms. The Deep River reservoir is aerated with the diffused aeration method, the system covering approximately four acres just upstream of the dam. The supply is fluoridated.

TRANSMISSION

MAINS	There are approximately 14 miles of transmission mains of 30 in. and 24 in. sizes delivering water from the reservoirs into the distribution system. Pipes are reported to be in need of cleaning and cement lining.
VALVES	Gate valve spacing averages 1.5 miles on the Deep River line and 1.0 mile on the Stony Brook line.

PUMPING

Stony Brook Pumping Station

LOCATION	On Salem Turnpike at Montville Road.
CAPACITY AND TYPE	Two 2,100 gpm DeLaval centrifugal pumps, each driven by a 150 hp electric motor.
CONTROL	Automatic, with backflow prevention.
YEAR COMPLETED	1956.

REMARKS	In 1964 the impellers of both pumps were replaced to lower the discharge pressure since many breaks were attributed to high pressure in the system.

Fairview Pumping Station

LOCATION	Below Fairview Dam.
CAPACITY AND TYPE	Two 1,750 gpm centrifugal pumps.
CONTROL	Manual.
YEAR COMPLETED	1941.

Yantic Lane Pumping Station

LOCATION	On Yantic Lane about 1,000 ft from the intersection with Fitchville Road.
CAPACITY AND TYPE	Two 650 gpm electric driven centrifugal pumps.
REMARKS	There is no storage in this area, service depends on pumping.

Private Auxiliary Pumping Stations

GENERAL	The State Hospital and Private Housing Developments own and operate booster stations. One of these is a 5 hp booster station on Plain Hill.

DISTRIBUTION

GENERAL	The existing distribution system consists of more than 107 miles of pipe. Supply in the City is mainly from 10 and 12 in. arteries supplying a closer gridiron of 6 in. pipe interspersed with a large amount of 4 in. pipe. The topography and configuration of rivers within the City has resulted in a very irregular pattern of mains which do not mutually support each other. The service area is located primarily within the City limits of Norwich, but also includes services in Bozrah, Fitchville, Montville and Lebanon.
MATERIALS	All of the older pipes over 4 in. are cast iron, but asbestos cement pipe has also been incorporated into the system recently. Pipes under 4 in. are either wrought iron, copper or lead.
CONDITION OF SYSTEM	The works were started in 1868; some of the existing pipes are as old as 100 years. The condition of the pipes varies from that of those newly installed to extremely poor for the older lines. Pipe is adversely affected by tuberculation as indicated by reduced carrying capacity of the supply mains and distribution lines.
PRESSURES	There are two booster stations in the distribution system. As a result of the varied elevations of Norwich, the areas higher than 220 ft are without service and the lower areas have rather high pressures. Pressures taken during fireflow tests averaged 73 psi, ranging from 44 to 106 psi.
FIRE PROTECTION	There are 722 fire hydrants. The area covered by each hydrant in the principal mercentile district is approximately 57,000 sq ft. The National Board of Fire Underwriters rating for Norwich City Consolidated District is 4B; the remaining areas of the Town have a 7D rating, with Yantic rated 8D.
VALVES	Gate valves open to the right; the number and makes and sizes of gate valves is not recorded. All supply mains are provided with air and blowoff valves. The average length of main that would be shut off in consequence of a single break is 550 ft in the principal mercentile district and about 1,000 ft in the more thickly built residential areas.
EMERGENCY CONNECTIONS	The number of independent sources eliminates the necessity for interconnection with other systems. There are no emergency connections with any other public water system.

INVENTORY OF PIPES

	DIAMETER IN INCHES	LENGTH IN FEET	% OF TOTAL
Supply Pipes	30	37,635	42.2
	24	38,643	43.4
	16	7,897	8.9
	12	1,930	2.2
	8	2,976	3.3
Total		89,081 16.8 miles	100.0
Transmission and Distribution Pipes	24	1,150	0.2
	20	3,990	0.7
	16	23,648	4.2
	14	2,920	0.5
	12	54,693	9.7
	10	50,895	9.0
	8	44,296	7.9
	6	278,176	49.3
	4	65,145	11.5
	3/4 to 1 1/2	19,953	3.5
	2 to 2 1/2	19,438	3.5
Total		564,304 107 miles	100.0

DISTRIBUTION STORAGE

There is no distribution storage in the system. Norwich Hospital has a 1.1 mil gal standpipe for its own use.

OPERATION OF SYSTEM

The system is normally operated by gravity, with Deep River as the principal source of supply to save pumping costs from the Stony Brook and Fairview sources. These two sources are used only when the quality of Deep River Reservoir is unacceptable, which frequently occurs during the summer months. The practice of changing sources, with accompanying flow reversals, causes frequent stirring of pipe sediments. The Taftville section is supplied by gravity by the two local small reservoirs. In case the Stony Brook pumping station is in operation, occasional backflow occurs into Reservoir No. 2. During most of the year the mains from Norwich to Taftville are closed, since the Taftville supply is sufficient. During quality or quantity problems the area is supplied from the Norwich system.

QUALITY OF SUPPLIED WATER

Analyses of samples collected within the distribution system show that during most of the year the water delivered to consumers is below the U.S. Public Health Service standards. Normally the water is slightly turbid and of moderately high color. Occasionally it has a distinct disagreeable taste and odor. Iron content, which is already high at the source, is further increased by corrosion within the distribution system. Bacteriological requirements are usually met; occasionally coliform organisms are present, however, indicating inadequate disinfection.

Samples taken from the distribution system showed the following characteristics:

Color	12 - 47 units
Odor	1 degree
Turbidity	2 - 3 units
pH	6.4 - 7.3
Nitrogen constituents	some
Total Hardness (as $CaCO_3$)	up to 180 mg/l
Iron	up to 0.6 mg/l

SERVICE RATES AND CHARGES

	Within the City of Norwich	Outside the City of Norwich
Minimum charge	$5.00	$6.30
Quarterly billing step rate system per 1,000 gal	23¢ to 12¢	

PROGRAMS BY DEPARTMENT OF PUBLIC UTILITIES

HYDRANT INSPECTION	Hydrants are flushed and inspected during the spring months; any defects are repaired at this time.
HYDRANT FLOW TEST	Tests were run on April 8, 1954.
VALVE INSPECTION	There are no regular inspections of valves; they are operated only as necessitated by work in the vicinity.
METER REPAIRING AND ADJUSTING	By meter department.
LINE FLUSHING	Twice a year.
LEAKAGE SURVEY	Presently being conducted.

FUTURE PLANNING

An improvement program presently being carried out calls for:

a. A treatment plant and pumping station with a peak capacity of 10.2 mgd to be constructed below the dam at Deep River.

b. The 30 in. and 24 in. Deep River transmission main to be cleaned and cement lined.

c. Wells with a pumping capacity of about 4 mgd to be developed at Norwichtown and upstream along the Yantic River.

d. Additional feeder and distribution lines.

e. The spillway elevation at Deep River Reservoir to be raised.

f. Distribution storage facilities.

REFERENCES

1. Surface Water Supplies Available in Southeastern Connecticut. Metcalf and Eddy, April, 1962.

2. Water Supply and Treatment Facilities for the City of Norwich. Charles A. Maguire and Associates, June, 1968.

3. Report of the National Board of Fire Underwriters.

4. Inspection of the Treatment and Distribution Facilities of the Public Water Supply of the City of Norwich. Connecticut State Department of Health, April 21, 1967.

COUNTRYSIDE DRIVE

This small community supply serving 21 homes is owned and operated by the Trask Well Company. The houses connected to the system are located on Melody Lane, Sunrise Street, Evergreen Street and Canterbury Turnpike. There is no definite area served by the supply, since many of the residences in the service area depend on individual wells. The 21 homes served have an estimated population of 70 people and average daily water consumption of 4,200 gal.

The source of supply is a 6 in. drilled well 175 ft deep, located at the intersection of Evergreen Street and Melody Lane. A 10 ft by 10 ft concrete pit, erected over the well, houses a 1 hp turbine pump with a capacity of 20 gpm. It is a hydropneumatic system with a 500 gal storage tank installed in the pump pit. The pressure switches are set on 40 and 60 psi. A sump pump is installed in the pit. There is no master meter. The supply is not treated.

The distribution system consists of 6 in. asbestos cement pipe and 2 in. plastic pipes. The services are 3/4 in. copper with curb boxes and shut off valves. Annual charges are $25, billed twice a year.

FLYERS DRIVE

GENERAL

Homes along Flyers Drive are served by a water company owned and operated by the Trask Well Company. Flyers Drive is located between Canterbury Turnpike and Harland Road just south from Fairview Reservoir. The system originated in 1937.

The topography of the area is gently sloping. Flyers Drive is parallel with Lambert Drive and approximately 30 ft higher. Elevations range between 330 and 370 ft.

There are 68 homes connected to this system. Estimated population is 230. Estimated daily average consumption is 14,000 gal. There are no meters in the system.

SOURCE OF SUPPLY

DESCRIPTION	The source of supply consists of three wells operating in sequence. Well No. 2 is located at the northwestern end of the street and Wells 1 and 3 are at the southeastern end. Well No. 1: 6 in. drilled well, depth: 125 ft, yield 25 gpm, installed 1937. Well No. 2: 6 in. drilled well, depth: 200 ft, yield 15 gpm, installed 1947. Well No. 3: 6 in. drilled well, depth: 300 ft, yield 12 gpm, installed 1949.
WELL PUMPING	Well No. 1: Positive displacement Deming pump. Well No. 2: Turbine Pomona 3 hp pump. Well No. 3: Submersible Deming 1 hp pump.
REMARKS	All well pumps are installed in concrete pits approximately 10 ft by 15 ft size. Trask Well Company owns a building lot at each well location, approximately 1/2 acre in size. A sump pump is installed at Well No. 1.
EMERGENCY	The system is interconnected with the Lambert Drive supply with a normally closed valve. In case of emergency it can be opened. There is no standby power source.

TREATMENT

The supply is chlorinated. Two small hypochlorinators are installed at Well Nos. 1 and 2. Well No. 3 is normally not used.

TRANSMISSION AND DISTRIBUTION

GENERAL	The distribution system consists of a single main along Flyers Drive which is 2 in. and 2 1/2 in. and made of wrought iron. Service lines are mainly 3/4 in. copper, with a few plastic lines.
PRESSURES	Pressure in the system ranges between 30 and 70 psi.

STORAGE FACILITIES

DESCRIPTION	At each pump pit there are one or two steel pressure tanks.
CAPACITY AND TYPE	At Well No. 1: two 1,000 gal storage tanks. At Well No. 2: two 750 gal storage tanks. At Well No. 3: one 120 gal air cushion tank.
CONTROL	These tanks form a single hydropneumatic system.

OPERATION OF SYSTEM

DESCRIPTION	It is an automatic hydropneumatic system. Pressure switches are set in such a manner that first No. 1 pump, then No. 2 pump, and, under emergency conditions, No. 3 pump, operates. Pressure levels are adjusted to the same static head conditions. Due to elevation differences, pressure switches are set at 40-60 psi at No. 1 pump, 50 to 70 at No. 2 pump, and 30 to 50 at No. 3 pump.

WATER QUALITY

Samples taken by the State Health Department from the distribution system showed the following characteristics:

Occasional color and odor problems	
Turbidity	1 unit
pH	5.8 - 6.5
Considerable amount of nitrogen constituents	
Total hardness	80 mg/l
One sample out of four showed a coliform count of	16 (MPN)

Due to this quality problem, the Health Department ordered chlorination.

WATER RATES

A flat annual rate of $25 is charged, billed twice a year.

MAINTENANCE

The system is maintained by the owner.

LAMBERT DRIVE ASSOCIATION

GENERAL

The Lambert Drive Association, a homeowners' association, operates a water utility for the houses located on both sides of Lambert Drive. The development was constructed by Mr. Lambert and the water utility turned over to the homeowners' association. This community of medium priced homes on 1/2 acre lots is located south of Fairview Reservoir and extends between Harland Road and the Canterbury Turnpike. The road slopes from Harland Road at El 370 to Canterbury Turnpike at El 310. The homes were constructed during the late 1950's.

There are 54 services, and the estimated population is 180. There are only two homes on this street not connected to the system. Estimated average daily water consumption is 11,000 gal.

SOURCE OF SUPPLY

DESCRIPTION

There are two wells serving this development. The second well was installed recently to secure a dual source for more dependability. The association owns approximately four acres of land at the well locations. The wells are located on the east side of Lambert Drive approximately halfway between the two main roads. The area will be fenced in the near future.

Well No. 1: 6 in. drilled, 210 ft deep, installed 1955.
Well No. 2: 6 in. drilled, 240 ft deep, installed 1969.

WELL PUMPING

Both units are identical vertical centrifugal pumps with 5 hp motors, pump capacity 55 gpm. It is a hydropneumatic system with the well pumps providing the entire required head. The pumps are controlled automatically.

REMARKS

Pump No. 1 is housed in a concrete block structure partially buried. Pump No. 2 is housed in a new 8 by 10 ft concrete block building.

EMERGENCY

For emergency conditions the system is interconnected with the Flyers Drive supply. There is no emergency power source.

TREATMENT

The supply is untreated.

TRANSMISSION AND DISTRIBUTION

GENERAL

The system consists of a single 3 in. galvanized iron pipe along the street. The service connections are all copper, but not every house is valved. The pipe is laid four ft deep. Minimum pressure in the system is 35 psi.

STORAGE FACILITIES

LOCATION	At each pumphouse a storage tank is installed in the wall of the structure.
CAPACITY AND TYPE	Both tanks are pressure tanks, 1,000 gal capacity at the first well and 2,000 gal capacity at the second.
CONTROL	Both pumps are controlled by pressure switches from the storage tanks. The pumps start at 55 psi and shut off at 90 psi. A small air compressor is located at both tanks. The relatively high pressure setting is needed because the pumps are located considerably lower than the services.

WATER QUALITY

GENERAL	Samples taken by the State Health Department showed very slight color and odor traces, a pH of 6.8, traces of nitrogen, 64 mg/l total hardness and 0.4 mg/l iron content.

WATER RATES

Annual water charges are $36.

MAINTENANCE

One of the residents is paid for part-time work on maintenance. All repairs are done by contractors. The system was designed and installed by Aetna Engineering.

LITTLE VALLEY MOBILE VILLAGE

Little Valley Mobile Village, constructed in 1966, is located on the east side of Mohegan Park Road approximately 2,000 ft south from its intersection with Hunters Road. The topography of the area is hilly; elevations slope from Mohegan Park Road at 330 ft to 200 ft. Plans call for 140 units; presently there are 100 units on 13 acres of property. Estimated population is 280. Estimated water consumption is 14,000 gpd.

The source of supply is a 6 in. drilled well, 625 ft deep, located at the entrance to Mohegan Park. The yield of the well is 32 gpm. A submersible 7.5 hp pump discharges water into a 10,000 gal storage tank; a horizontal centrifugal pump takes suction from this tank and discharges into a 5,000 gal hydropneumatic tank, pressurized by a small air compressor. There is no emergency power source; however, the park can be served by gravity flow. The pumphouse is a 12 x 20 ft concrete structure. The distribution system consists of approximately 0.5 miles of 2 and 3 in. plastic pipes, mostly looped, and valved at intersections. Services are 3/4 in. plastic. There are no meters. Pressure ranges between 30 and 50 psi. There are no separate charges for water service, which is furnished with the rental space.

OAKLAND HEIGHTS MOBILE HOME PARK

Oakland Heights is a privately owned mobile home park, initiated in 1968 and presently being extended. The park is located on the south side of Hunters Road approximately 3,000 ft from Taft Station. Elevations range from 150 to 240 ft. Presently there are 33 mobile homes on the 40-acre park; plans call for 154 units.

The source of supply is a 6 in. drilled well, 135 ft deep. A submersible pump with a capacity of 35 gpm discharges into a 5,000 gal storage tank. A 3 hp booster pump taking its suction from this storage tank discharges into a 2,000 gal hydropneumatic tank.

The pumps and part of the tank are installed in an 8 by 15 ft concrete pit, with a sump pump. Another similar installation is planned for the other end of the development presently under construction. The distribution system consists of 6 and 4 in. asbestos cement pipes laid in loops, valved at intersections. Service pipes are 1/2 in. copper. A few hydrants will be located in the development if the city supply extends to this area in the future. Pressure switches in the hydropneumatic system are set at 60 and 80 psi. Static pressure in the system is somewhat less.

There are no water charges for the units; it is included in the rent.

OCCUM WATER COMPANY

GENERAL

The privately owned and operated Occum Water Company serves part of the town's residences and also the local textile mill. The system was constructed for the mill a long time ago. Elevations of the service area range from 60 to 100 ft.

There are 41 services, including the mill, serving an estimated population of 120. Daily average consumption is estimated at 6,000 gal.

SOURCE OF SUPPLY

DESCRIPTION	No. 1 gravel packed dug well: 30 in. diameter, 18 ft deep. No. 2 drilled well: 6 in. diameter, 110 ft deep. No. 3 drilled well: 6 in. diameter, 130 ft deep. No. 4 drilled well: 6 in. diameter, 140 ft deep. No. 5 drilled well: 6 in. diameter, 125 ft deep. The estimated total yield of the system is 75 gpm. No. 2 well has the highest yield, approximately 25 gpm and No. 4 the lowest, approximately 8 gpm.
WELL PUMPING	No. 1 well has a 1 hp centrifugal pump. No. 2 well has a 1 1/2 hp submersible pump and two 1/2 hp pumps. No. 3 well has no pump. Nos. 4 and 5 have 1/2 hp pumps.
REMARKS	No. 1 and No. 2 pumps are housed in a 10 x 10 ft frame structure on concrete footings.
EMERGENCY	There is no emergency power source.

TREATMENT

A hypochlorinator is installed in the pumphouse.

TRANSMISSION AND DISTRIBUTION

GENERAL	The system consists of mostly cast iron pipes. Some of the pipes are tuberculated, and plastic pipes are presently being installed. The system is looped. It has no valves or hydrants.
MATERIALS AND LENGTHS	4 in. cast iron, 400 ft. 6 in. cast iron, 2,700 ft. 3 in. plastic, 1,300 ft. 1 1/2 in. galvanized iron, 325 ft. Total length, 4,725 ft.
PRESSURES	The highest discharge pressure is 65 psi. Average pressure in the system is 45 psi.

STORAGE FACILITIES

LOCATION	On a hill 100 ft west of the wells.
CAPACITY AND TYPE	15,000 gal concrete storage tank buried in the ground.

OPERATION OF SYSTEM

Normally No. 2 pump is operated, controlled by a float in the storage tank. In case pump No. 2 cannot take care of the demand, the other pumps are started manually. The float control signal is transmitted through telephone line to the pump.

WATER RATES

There are no meters in the system. A flat rate of $3.25 is charged monthly.

REMARKS

Karen Textile Company has a 55,000 gal elevated storage tank for fire protection purposes.

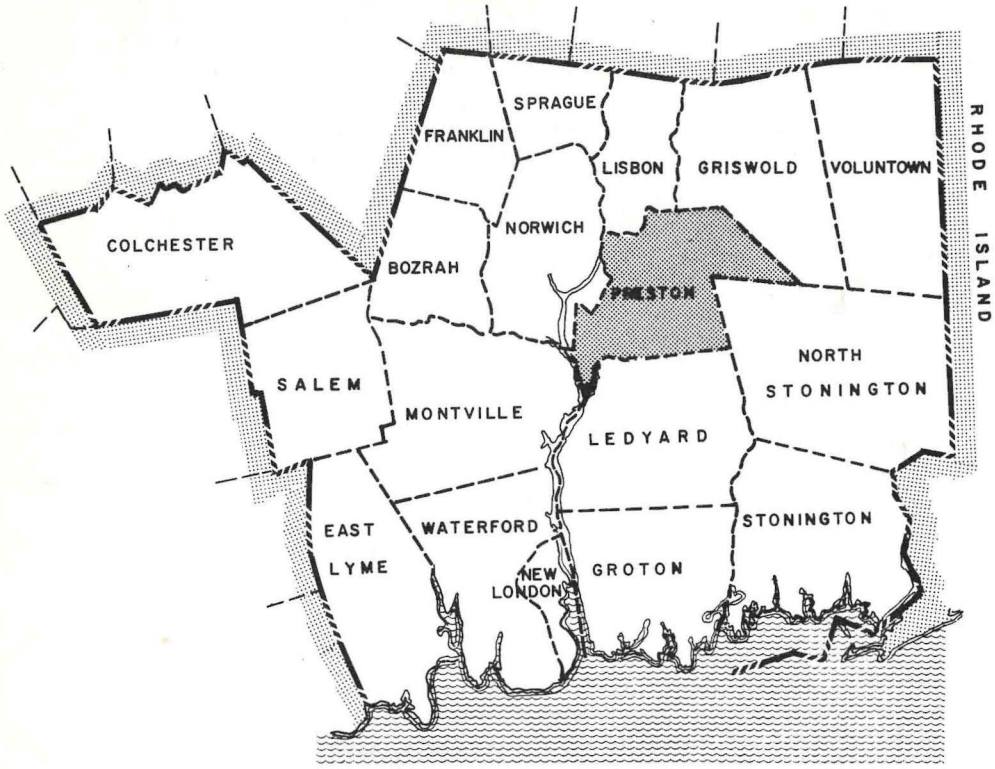
PLEASURE VALLEY MOBILE HOME PARK

Pleasure Valley Mobile Home Park, established in 1967, is owned and operated by Arthur Mellor. The park is located at the northern edge of the town south of Lillibridge Road, south of Cote Pond. The area is hilly, elevations ranging from 150 to 200 ft. The area encompasses 80 acres of land. There are presently 84 mobile homes with room for a total of 106. Estimated population is 210. Water consumption is estimated at 10,500 gpd.

The source of supply consists of two 2 in diameter drilled wells. Well No. 1 is 410 ft deep, yield 18 gpm; Well No. 2 is 256 ft deep, yield 53 gpm. In each well a 5 hp submersible pump is installed, discharging water into a 5,000 gal storage tank. The well pumps are controlled by a float control from the storage tank. Two 2 1/2 hp horizontal centrifugal pumps deliver water from the storage tank into six parallel interconnected pneumatic tanks. From the pneumatic tanks water is discharged directly to the customers. The well pumps and pressure tanks are installed in a 15 by 30 ft concrete pit; the storage tank is in the wall of this structure.

The distribution system consists of approximately 1 mile of 3 in. plastic pipes, well looped. Valves are located at intersections. There are no meters in the system. Water is provided as part of the space rental. The system was installed by the owner, who is a general contractor.

PRESTON



GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Located in the northern part of the Region immediately east of Norwich, Preston comprises 31.5 square miles. It contains numerous hills, many of which are broadly topped and well suited for eventual development. Elevations range from near sea level along the Thames River to more than 500 feet in the extreme eastern end of the town. Relief varies considerably, but averages about 150 feet.

TRANSPORTATION

State highways serving Preston include Routes 2, 12, 164, 165, and 117. Routes 2A and 164 provide direct links to the Connecticut Turnpike which passes through the neighboring towns of Montville and Griswold. Freight transportation is provided by several local and nearby trucking firms. A branch line of the New Haven Railroad passes through the southwestern corner of the town but provides no service at present.

INSTITUTIONS AND INDUSTRY

Preston contains the site of the Norwich Hospital, a large state mental institution. There are no major industrial or commercial activities in the town.

GOVERNMENT

Preston has a selectmen-town meeting-board of finance form of government.

POPULATION

The non-institutional population of Preston was 2,778 in 1960 and is estimated to be about 2,900. The population is scattered throughout the town with no significant concentrations.

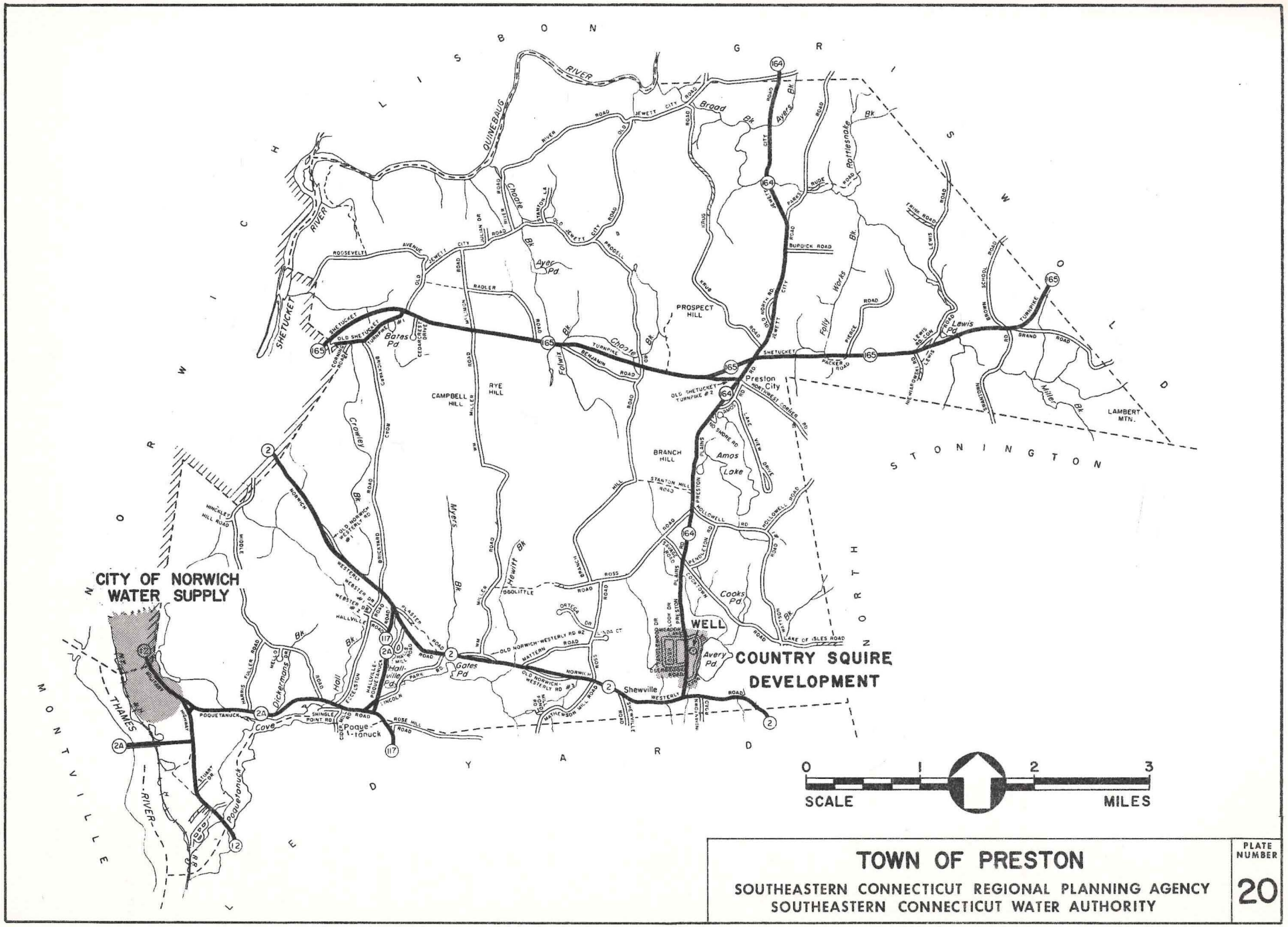
WATER SYSTEMS

The Town of Preston does not own any water works facilities. There is only one housing development, the Country Squire Corporation, supplied by a privately owned water supply system. In addition, the Norwich State Hospital, on Route 12 adjacent to the Norwich City Line, is served by the Norwich water supply system. The hospital's water consumption is included in summary data on the City of Norwich water supply. The following data on Preston do not include the population at the hospital. Plate No. 20 shows the areas presently served by public and private water systems.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	58
Population served	200
Average output	12,000 gpd
Individual Wells	
Number of wells*	820
Population served*	2,800
Average output*	168,000 gpd
TOTAL	
Number of consumers*	878
Population served*	3,000
Average output*	180,000 gpd

* Estimated



TOWN OF PRESTON

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 20

COUNTRY SQUIRE DEVELOPMENT

GENERAL

The Country Squire Development water supply is owned and operated by Charles J. Rajewski. The service area is located west of Avery Pond on both sides of Route 164. The development was started in 1960 and designed for 120 houses. Presently there are 58 homes and the estimated population is 200. Average daily water consumption is 12,000 gal. The topography of the area is hilly; elevations range from the pond level of 116 ft to 200 ft on the northwest corner of the development.

SOURCE OF SUPPLY

DESCRIPTION	The source of supply is a drilled 6 in. diameter well, 93 ft deep.
WELL PUMPING	A horizontal, centrifugal 2 hp pump is installed above the well, with a capacity of 35 gpm.
REMARKS	The pumps, air compressor and portions of the tanks are housed in a 10 ft by 15 ft concrete block structure 250 ft west of the pond on the side of a hill.

TREATMENT

The supply is untreated.

PUMPING

LOCATION	In the well pumphouse.
DESCRIPTION	One 10 hp centrifugal 65 gpm capacity booster pump.
CONTROL	The pump is controlled by a pressure switch set at 60 and 80 psi.
EMERGENCY	A gasoline driven stand-by pump is installed.

TRANSMISSION AND DISTRIBUTION

GENERAL — The system consists of 4 and 6 in. cast iron pipes, all looped, installed at a minimum depth of four ft. Pipes are installed in the entire development regardless of the extent of house construction. The highway is crossed at two points and a parallel main line is laid on both sides of the highway. All service lines are copper.

MATERIALS AND LENGTHS

6 in. cast iron pipe	3,777 ft
4 in. cast iron pipe	3,083 ft
2 in. cast iron pipe	100 ft
3/4 in. copper tubing	1,200 ft
Total length	8,160 ft or 1.55 miles

PRESSURES	At the highest point of the development static pressure of 42 psi was measured; at lower elevations pressures range to 80 psi.
METERS	All services are metered, but there is no master meter.

STORAGE FACILITIES

LOCATION	At pumphouse.
CAPACITY AND TYPE	10,000 gal steel storage tank and 5,000 gal steel pressure tank.
CONTROL	Automatic float control in the storage tank and automatic pressure switch in the hydropneumatic tank. A small air compressor maintains air pressure in the tank.

OPERATION OF SYSTEM

DESCRIPTION	The system operates automatically. The well pump is started by the float control and the booster pumps by pressure control.

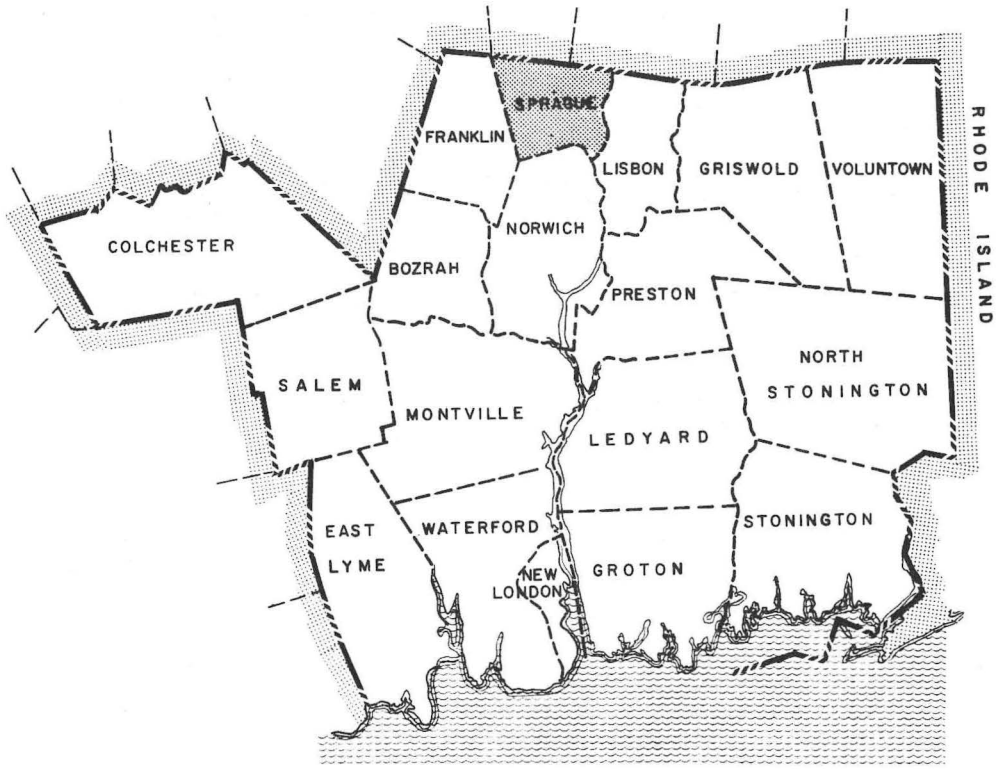
WATER QUALITY

Samples taken from the distribution system by the State Health Department showed a good quality water, although somewhat hard.

MAINTENANCE

The system is maintained by the developer's permanent employee on a part-time basis.

SPRAGUE



GENERAL DESCRIPTION

PHYSICAL CHARACTERISTICS

Sprague occupies an area of 13.8 square miles along the northern border of the Region. The Shetucket River passes through the town from north to south and forms a part of its southern border. Elevations range from 50 feet above sea level along the river to about 450 feet on adjacent hilltops.

TRANSPORTATION

Freight service is provided by rail and truck. State highways serving Sprague are Routes 97, 138, and 207.

INSTITUTIONS AND INDUSTRY

There are no major institutions in Sprague, but important local industries produce paper board and boxes and engravings. A large mill building, formerly housing the Baltic Woolen Mill, now stands vacant. A small commercial area serving local needs is situated in the Village of Baltic.

GOVERNMENT

Sprague has a selectmen-town meeting-board of finance form of government.

POPULATION

The population of Sprague, which was 2,509 in 1960, is now estimated to be 2,800 persons. About half of the population lives in or near the Village of Baltic, and the remainder is scattered throughout the town.

WATER SYSTEMS

The Town of Sprague has a municipally owned and operated water system serving the Village of Baltic. In Hanover, the Angus Park Woolen Company provides public water service to the local residents. Approximately two-thirds of the total town population is served by public facilities and the rest depend upon individual sources.

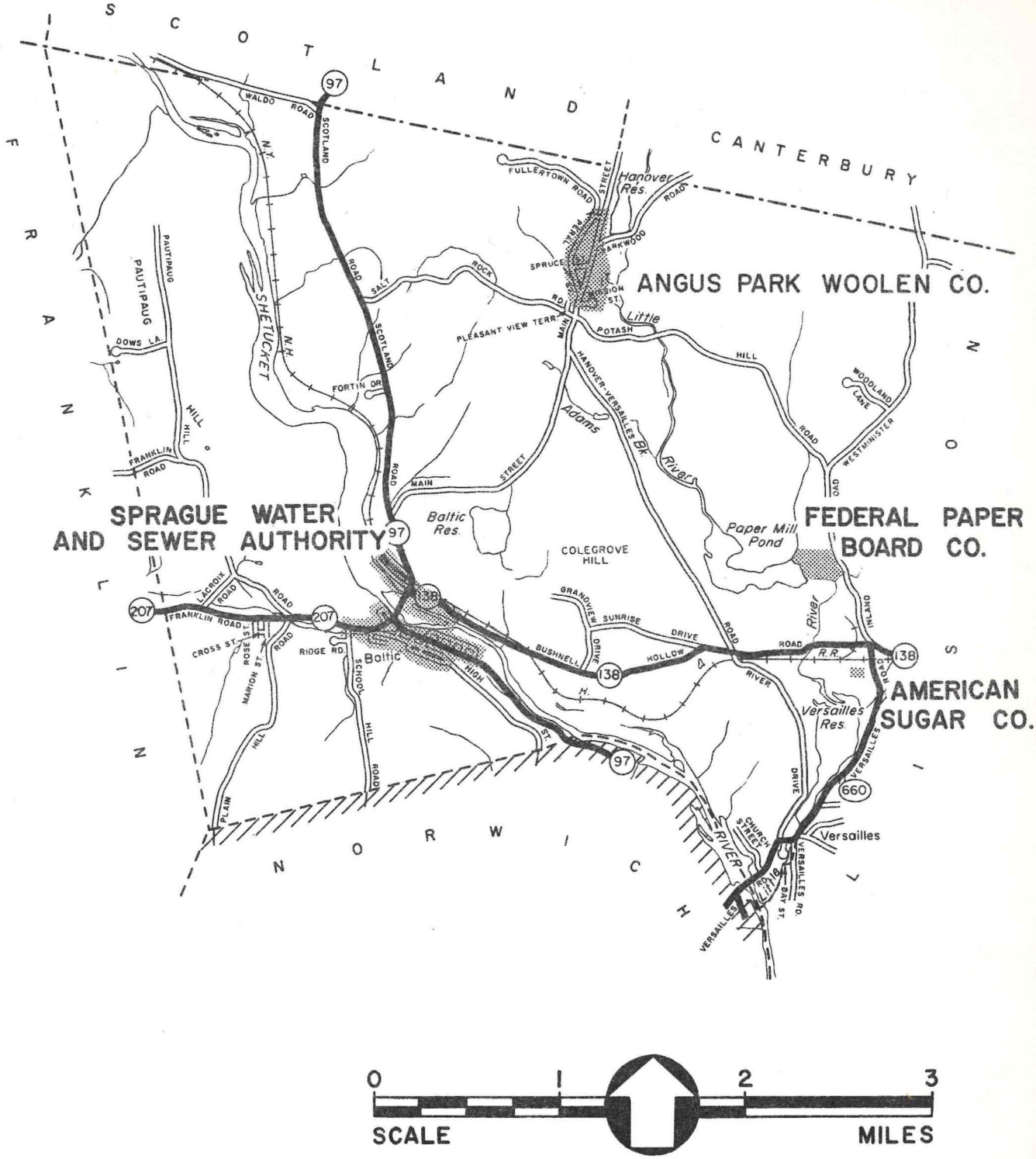
Other industry uses large amounts of process and cooling water and limited amounts for welfare purposes. Process water is drawn principally from Papermill Pond, with welfare water being taken from individual wells.

The location of the industries and the areas serviced by the public supplies are shown on Plate No. 21.

SUMMARY OF WATER SUPPLY DATA

Water Works Systems	
Number of services	384
Population served	1,750
Average output	160,000 gpd
Individual Wells - Domestic	
Number of wells*	280
Population served*	950
Average output*	57,000 gpd
Individual Wells - Industrial	
Number of wells	5
Average output*	9,000 gpd
TOTAL	
Number of consumers	669
Population served	2,700
Industries served	2
Average output*	226,000 gpd

* Estimated



TOWN OF SPRAGUE

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 21

AMERICAN SUGAR COMPANY

The relatively new plant constructed by the American Sugar Company produces paper and cardboard packaging material for the company. There are 180 employees at the plant. Estimated average daily domestic water consumption is 2,500 gal.

The source of supply is 2 drilled wells, each 200 ft deep. Vertical turbine pumps at the well locations deliver the water into the 50,000 gal watersphere. Well No. 1 has a 60 gpm pump which discharges under 38 ft head and Well No. 2 discharges 38 gpm under 70 ft head. The pumps operate by automatic pressure control. Only the upper 3 ft volume is used for domestic water consumption; the rest of the reservoir serves as fire protection.

ANGUS PARK WOOLEN COMPANY

GENERAL

Angus Park Woolen Company, formerly known as Airlie Mills, Inc., is a privately owned mill which produces woolen fabrics. The company provides water service to the Village of Hanover, where all residences were previously owned by the factory.

The Village of Hanover is located approximately 2,000 ft south of the Windham County line, northeast of the Village of Baltic. The factory is located on a flat area along the banks of Little River and the residences are located on a hillside west of the factory. Elevations range from 160 to 250 ft. The water system was constructed in 1918.

In addition to the factory, there are 46 residences served by the supply, which is unmetered. Estimated population served is 200, consuming an average of 60,000 gpd, including water used by the factory for welfare purposes.

SOURCE OF SUPPLY

DESCRIPTION — The source of supply is the Hanover reservoir, fed by the Little River.

Hanover Reservoir

LOCATION — The reservoir is located in the Village of Hanover, 900 ft north of the mill.

WATERSHED — The watershed tributary to Hanover Reservoir extends over 20 square miles. Due to the extent of this watershed, it is not protected.

DAM CONSTRUCTION — The dam is of the earth-fill type, with its spillway on the southeast corner. The intake is through a screened valve chamber on the upstream side of the dam. A 48-in. riveted steel penstock 900 ft long conveys water to the power house located downstream from the dam. The dam was originally constructed in the mid 1800's; the penstock was reconstructed in 1938.

CAPACITY — Maximum storage capacity is 80 mil gal. Safe yield of the reservoir is not known, but the present consumption is only a small fraction of the safe yield.

OPERATION — Water is discharged from the reservoir through the penstock. Part of this water is withdrawn from a 12 in. branch line to supply both industrial and domestic demands; the bulk of the flow is discharged into Little River through a water wheel which presently serves as an emergency pump for fire protection. A major part of the flow is passed over the spillway.

TREATMENT

DESCRIPTION — The treatment system, installed during the second decade of the century, is a very unique system in the sense that a modern treatment process is applied to an old-fashioned wood-fabricated plant. The process is pre-filtration, coagulation with soda ash and alum, sedimentation, pressure filtration and chlorination.

LOCATION — The treatment equipment is located in the boiler room at the north end of the mill.

EQUIPMENT	The equipment consists of wooden concentric tanks, where chemicals are fed from barrels with improvised float controls. Pressure filtration is accomplished in steel tanks. Chlorination is by a hypochlorinator.
CAPACITY	The rate of filtration is estimated at 200 gpm. The length of filter runs is 5 hr.
OPERATION	The system is operated manually. Each pressure filter is backwashed every other day for about 15 minutes. Sedimentation tanks are cleaned every 3 months. The system is frequently checked by the master mechanic.
EMERGENCY	A water powered generator is installed, previously having been used for plant electricity.

PUMPING

LOCATION	In boiler room with treatment equipment.
CAPACITY AND TYPE	One 200 gpm horizontal centrifugal pump.
CONTROL	Water level in the elevated tank is visually inspected by a telecontrolled float transmitted into the boiler room. In case of low water elevation, the pump is started manually.

TRANSMISSION AND DISTRIBUTION

GENERAL	The 48-in. penstock, described above, leads from the reservoir to a water wheel which used to be the power source of the plant. Presently it functions only as an emergency fire pump. Before this wheel a 12-in. branch is taken off which again branches into two 4-in. lines feeding the potable water treatment plant and the process distribution pump. The distribution system consists of single lines, serving the three sections of the community. Each section can be shut off with valves in case of break. The system functions as a gravity system from the elevated tank.
MATERIALS	The penstock and feed line is riveted steel, distribution mains are cast iron, and service lines are copper and plastic. Limited footage of galvanized iron pipe is also used. There are approximately 2,500 ft of 6 in. cast iron pipe. All pipes are laid 5 ft deep. There are no meters in the system.
PRESSURES	Pressure is provided from the elevated storage tank. The static level varies between 15 and 55 psi according to location. A few houses at the northwest part of the system have practically no pressure if the water level drops in the elevated tank.
FIRE PROTECTION	Fire protection is provided by 10 hydrants and sprinkler systems. In addition to the water available from the storage tank, a 1,000 gpm fire pump dirven by the water sheel is available.
VALVES	There are three shut-off valves in the distribution system separating the three main areas of the residences.

STORAGE FACILITIES

LOCATION	At the entrance of the plant.
CAPACITY AND TYPE	A 50,000 gal elevated tank.
CONTROL	By means of a float, the tank level is telemetered into the boiler room. By visual control the pump is started and the tank filled to overflow level.

OPERATION OF SYSTEM

DESCRIPTION	Water flows by gravity from the reservoir to the plant. The industrial and potable demand is supplied through two, four-in. branches, the excess returning to the river through the water wheel. The potable portion is passed through the filter plant by gravity, then pumped to the elevated tank.

WATER QUALITY

The following average water characteristics were measured:

	Raw Water	Treated Water
Color	23 units	6 units
Turbidity	3 units	-
pH		6.9
Iron	0.3 mg/l	0.1 mg/l
Coliform bacteria	4/100 ml	0

WATER RATES

A flat rate of $12 per year is charged.

REFERENCES

Chandler and Palmer prepared distribution maps in 1936.

FEDERAL PAPER BOARD COMPANY

The Federal Paper Board Company manufactures cardboards for packaging. The Company uses a large amount of water for process purposes and limited amounts for welfare needs. There are approximately 450 employees at the plant.

The source for domestic water is three wells, each yielding approximately 10 to 15 gpm. The system is hydropneumatic, served by submersible pumps. Approximate average daily consumption is 6,000 gal.

For process purposes, approximately 5 to 6 mgd is used from Papermill Pond.

Fire protection is provided from the pond with steam pumps. There are two large wells for industrial standby purposes. These 16 ft diameter wells produce 400 and 600 gpm respectively. Pumps are installed at the well locations.

SPRAGUE WATER AND SEWER AUTHORITY

GENERAL

The Town of Sprague owns and operates the water supply and distribution system in the Village of Baltic. The system is administered by the Water and Sewer Authority which has five appointed members. The supply is operated by a full-time employee and a part-time assistant.

The supply was formerly owned and operated by the Baltic Mills Company. The Town of Sprague bought the supply in January, 1968. The system was constructed around 1908.

The Village of Baltic is located on the west bank of the Shetucket River, where Route 97 crosses the River. Elevations range from 100 at the lowest service to 150 at the high points.

There are 338 services connected to the system; the estimated population served is 1,600. Average daily water consumption in 1968 was 100,000 gal, maximum day consumption was 124,000 gal on August 13, 1968.

SOURCE OF SUPPLY

DESCRIPTION — The source of supply is the Baltic Reservoir, fed by an open stream, which is dry during the summer months, and from numerous underground springs.

Baltic Reservoir

LOCATION — The reservoir is located approximately 2,000 ft north of the Village of Baltic.

WATERSHED — The reservoir has a watershed area of 160 acres, primarily wooded, with some fields and abandoned farm land. The reservoir is protected

by a dense wooded screen. The utility presently owns the entire watershed, with the exception of parcels of land along Hanover Road.

DAM CONSTRUCTION — There are two reinforced concrete dams, buttressed between outcrops of ledge rock. The dams were constructed in 1906 and pressure grouted in 1965. New wooden flash boards were installed recently. The heights of the dams are approximately 25 ft and 8 ft respectively.

CAPACITY — Maximum storage capacity is 110 mil gal, and the safe yield is 0.21 mgd.

OPERATION — The system functions as a gravity supply. A single 16 in. cast iron pipe feeds the system from the reservoir. Tests showed a 1,750 gpm flow with an 8 psi pressure drop in the transmission main.

TREATMENT

ALGAE CONTROL — Copper sulfate treatment of the reservoir is done on a yearly basis. The previous practice was to apply 200 lb (estimated dosage 0.5 ppm) of copper sulfate twice a year, and this treatment was effective since no algae problems were reported.

DISINFECTION — Flow meter controlled, hydraulically operated hypochlorinators are installed. One unit is on a bypass line designed to handle the normal flow rate, while peak flows are controlled from a main line unit activated by a pre-set weighted check valve.

REMARKS — The metering and chlorination building is a wood frame structure, located on a large ledge. The meter is an 8 in. in-line type with a 4 in. bypass.

TRANSMISSION AND DISTRIBUTION

GENERAL — The system is laid out in a gridiron pattern, fed by a single 16 in. line from the reservoir. Beyond Baltic Mills the line is reduced in size, and a 10 in. crossing at the Shetucket River feeds the entire village. The network is well looped, with a few dead-end lines. A layout of the system is shown on Plate No. 22.

MATERIALS AND LENGTHS — Pipes are mostly 6 in. and 8 in. cast iron pipe and local 2 in. galvanized iron pipe. Total length of pipes is 3.59 miles. There are no customer meters in the system. A master meter is installed at the end of the transmission main. Many of the pipes are tuberculated and as a consequence produce a large pressure drop. There are valves at main intersections and shut-offs at each service connection.

PRESSURES — The elevation of the water level at the Reservoir is 268 ft. Since most of the village is below elevation 150 there is ample pressure provided to the customers; however, advanced tuberculation causes considerable pressure drop.

FIRE PROTECTION — There are 40 hydrants in the village and an additional 18 in the Baltic Mills area.

STORAGE FACILITIES

The Baltic Reservoir is the primary source and reservoir for the municipal supply. A 1 mil gal concrete storage tank is located within the Baltic Mills property to serve the needs of the plant.

OPERATION OF SYSTEM

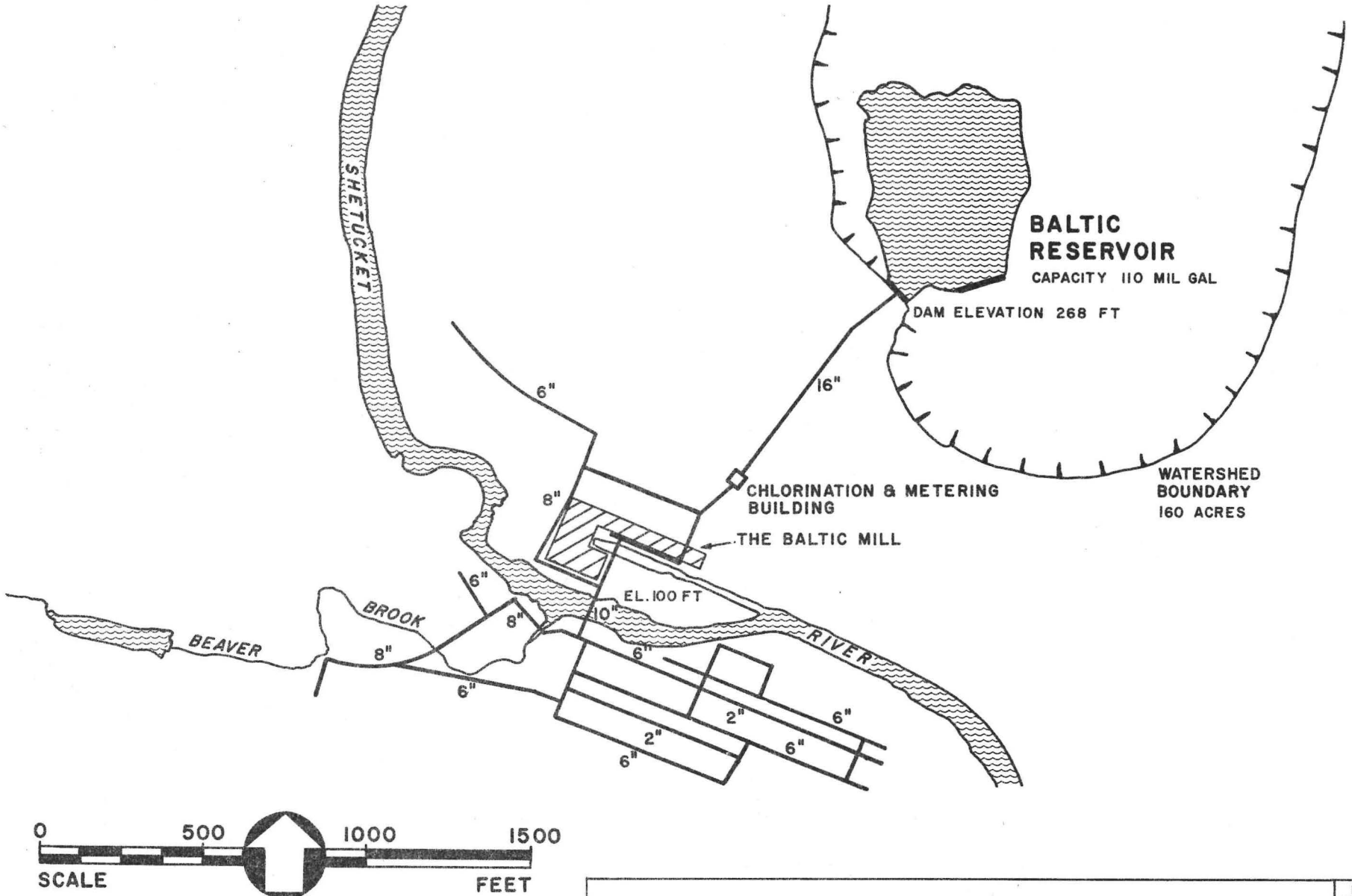
The system functions as a gravity supply from the reservoir into the village.

WATER QUALITY

Samples taken by the State Health Department showed the following raw water characteristics:

Color	occasionally high
Odor	earthy and musty
Turbidity	0 - 5 units
pH	6.5 - 7.0
Nitrogen constituents	traces
Total hardness	20.0 mg/l
Coliform count	moderate

The high color was due to the corroded pipes.



BALTIC WATER SUPPLY DIAGRAM

SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY
SOUTHEASTERN CONNECTICUT WATER AUTHORITY

PLATE NUMBER 22

WATER RATES

Semi-annual minimum rate is $20, with additional charges levied for each extra outlet, ranging from $1 to $4 per unit.

MAINTENANCE

The system is operated and maintained by the Town. In addition to the regular employees, the Town Highway Department gives assistance in excavation and similar work. Systematic flushing is practiced and the reservoir is regularly patrolled and maintained.

REFERENCES

Preliminary Report - Water System. James S. Minges & Associates, 1967.

4

APPENDIX

APPENDIX

BACTERIOLOGIC REQUIREMENTS OF POTABLE WATER

Water is a potential carrier of many infectious diseases. Through measures that include protection of the source of supply, treatment, and sanitary control of the distribution system, public water supplies can be made safe for drinking.

The Connecticut State Health Department controls public water supplies on the basis of frequent surveys made of the water system and laboratory examination of the water. Bacteriological analysis of water may be subject to wide misinterpretation unless considered in the full light of information concerning the supply examined.

The main indicative measure in bacteriological analysis is the presence or absence of bacteria of the coliform group. The American Water Works Association has prepared a set of operating goals, which recommends no coliform organisms on the basis that the water supplies of utilities with high standards of operation have shown only a fraction of one coliform organism per liter over periods of many years.

U.S. PUBLIC HEALTH SERVICE DRINKING WATER STANDARDS - 1962

PHYSICAL CHARACTERISTICS

Limits - Drinking water should contain no impurity which would cause offense to the sense of sight, taste, or smell. Under general use, the following limits should not be exceeded.

Turbidity	5 units
Color	15 units
Threshold Odor Number	3 units

CHEMICAL CHARACTERISTICS

Excess of the following is unacceptable:

Substance	mg/l
Arsenic (As)	.05
Barium (Ba)	1.0
Cadmium (Cd)	0.01
Chromium (hexavalent)	0.05
Cyanide (CN)	0.2
Lead (Pb)	0.05
Selenium (Se)	0.01
Silver (Ag)	0.05

Radioactivity: The following should not be exceeded (yearly average):

Substance	UUC/1.
Radium 226	3
Strontium 90	10
Gross beta activity (Strontium-90 and alpha emitters absent)	1,000

The following substances should not be present in excess of the amount shown if better water can be made available:

Substance	mg/l
Alkyl Benzene Sulfonate (ABS)	0.5
Arsenic (As)	0.01
Chloride (Cl)	250.0
Copper (Cu)	1.0
Carbon Chloroform Extract (CCE)	0.2
Cyanide (CN)	0.01
Iron (Fe)	0.3

Manganese (Mn)	0.05
Nitrate (as N0	10.0
Phenols	0.001
Sulfate (SO4)	250.0
Total Dissolved Solids	500.0
Zinc (Zn)	5.0

Fluoride*

Recommended Control Limits mg/l of Fluoride		
Lower	Optimum	Upper
0.8	1.0	1.3

* Connecticut state law requires fluoride content to be maintained between 0.8 mg/l to 1.2 mg/l where artificial fluoridation is carried out.

Connecticut state law requires public water supplies serving 20,000 or more persons to maintain a fluoride content as stated above.

INVENTORY OF WATER SUPPLY SYSTEMS

MUNICIPALITY		POPULATION AND CUSTOMER DATA					SOURCE OF SUPPLY		1968 PRODUCTION							WATER WORKS DATA				
Water Service	Ownership	1960 Census	1968 Estimate	% Served	Services	Meters	Description	Est. yield (mgd)	Avg. Day (1,000 gal)	Max. Day (1,000 gal)	Residential (percent)	Ind. & Comm'l (percent)	Other (percent)	Avg. Res. Cons. (gpd/cap)	Total Prod. (gpd/cap)	Distrib. Reservoir (1,000 gallons)	Ground Storage (1,000 gallons)	Pressure range (psi)	Treatment code	Length of Pipes (miles)
BOZRAH																				
	Total	1,509	1,900	100.0	560	-			114	-										
Residential Wells	Total				560	-	Miscellaneous wells	N.K.	114	-	100									
COLCHESTER																				
	Total	4,648	5,800	100.0	1,658	920			360	-										
Borough of Colchester	Inv.		3,450	59.5	968	920	Gravel packed wells (2)	0.37	220	350	70	10	20	45	64	375	-	10-100	2, 3, 6	17.0
Colchester Community Water Association	Hom.		80	1.4	20	-	Drilled well	0.07	4	-	100	-	-	60	60	-	5	25-40	1	0.2
Public Utilities	Total		3,530	60.9	988	-		0.44	224	-	-	-	-	46	64	375	5	-	-	17.2
Residential Wells	Total		2,270	39.1	670	-	Miscellaneous wells (670)	N.K.	136	-	100	-	-	60	60	-	-	-	-	-
EAST LYME																				
	Total	6,782	9,800	100.0	2,841	370			722	-										
Bargnesi Water Works - Crossley Court	Inv.		85	0.9	25	-	Gravel packed well (1)	0.04	5	-	100	-	-	59	59	-	1	35-50	1	0.2
Bargnesi Water Works - Gorton Pond	Inv.		85	0.9	25	-	Gravel packed well (1)	0.04	5	-	100	-	-	59	59	-	1	25-50	1	0.2
Black Point Water Company*	Inv.		355	3.6	75	-	Drilled wells (3)	0.15	50	-	100	-	-	140	140	50	-	50-80	1	5.0
Camp Dempsey	Govt.		-	-	-	-	Drilled wells (2)	0.10	25	-	-	100	-	-	N.A.	100	-	50	2, 3, 4	2.0
Carriage Hill	Inv.		340	3.5	100	100	Gravel packed (1)	0.12	20	-	100	-	-	59	59	-	12	20-50	1	1.7
Connecticut State Farm For Women	Govt.		250	2.5	-	-	Dug well	0.20	35	-	-	50	50	70	140	180	-	30-50	2, 3	2.5
Dodge Towne House Apartments	Inv.		100	1.0	44	-	Drilled well	0.03	5	-	100	-	-	50	50	-	6	25-40	1	1.0
East Lyme Water Commission	Mun.		578	5.9	270	270	Dug well	0.10	70	100	80	20	-	97	122	100	-	30-50	1	3.9
Giant's Neck Beach Association*	Inv.		400	4.1	90	-	Drilled wells (2) Dug well (1)	0.05	20	-	100	-	-	50	50	-	10	30-45	1	2.2
Giant's Neck Heights*	Inv.		400	4.1	95	-	Drilled wells (2)	0.04	30	-	100	-	-	75	75	-	10	30-80	1	5.0
Laurel Hill Acres	Inv.		280	2.9	75	-	Gravel packed (1)	0.04	17	-	100	-	-	60	60	-	10	30-70	2, 6	1.75
Motels	Com.		-	-	3	-	Drilled wells (3)	0.03	15	-	-	100#	-	-	N.A.	-	15	30-50	1	-
Rocky Neck State Park*	Govt.		-	-	17	-	Drilled wells (19)	0.20	N.K.	-	-	100#	-	-	N.A.	-	15	N.A.	1	-
Roxbury Park Water Company	Inv.		450	4.6	122	-	Drilled wells (3)	0.10	25	-	100	-	-	56	56	-	30	30-55	2	2.0
Public Utilities and Other	Total		3,323	34.0	941	370		1.24	322	-	-	-	-	70	100	430	110	-	-	27.5
Residential Wells	Total		6,477	66.0	1,900	-	Miscellaneous wells (1,900)	N.K.	400	-	100	-	-	60	60	-	-	-	-	-
FRANKLIN																				
	Total	974	1,200	100.0	350	-			72	-										
Residential Wells	Total				350	-	Miscellaneous wells	N.K.	72	-	100									
GRISWOLD																				
	Total	6,742	7,200	100.0	1,590	52			886	-										
Country Mobile Estates	Inv.		250	3.5	80	-	Drilled wells (2)	0.05	12	-	100	-	-	50	50	12	-	12-60	1	1.0
Jewett City Water Company	Inv.		5,210	72.4	994	52	Stonehill Reservoir Driven and drilled wells (2)	0.5 0.5	770	1,063	46	44	10	-	-	-	1	40-100	2	15.4
Lakeview Mobile Home Park	Inv.		120	1.7	38	-	Artesian well	N.K.	7	-	100	-	-	60	60	-	1	30-50	1	0.4
Lisee's Mobile Home Court	Inv.		65	0.9	28	-	Drilled well	0.03	3	-	100	-	-	50	50	-	0.2	30-50	1	0.3
Public Utilities	Total		5,645	78.5	1,140	52		1.1	792	-	-	-	-	67	140	12	2.2	-	-	17.1
Residential Wells	Total		1,555	21.5	450	-	Miscellaneous Wells (450)	N.K.	94	-	100	-	-	60	60	-	-	-	-	-
GROTON AND STONINGTON																				
	Total	43,906	60,300	100.0	13,003	8,261			11,241											
Arlington Acres Mobile Homes	Inv.		450	0.7	140	-	Drilled wells (2)	0.03	27	-	100	-	-	60	60	-	18	30-50	1	3.2
City of Groton Public Supply	Mun.		29,200	48.5	3,912	3,647	Six reservoirs and diversion dam	12.1	9,390	11,120	22	67	11	70	321	3,340	-	30-80	2, 4, 6, 7, 8	81.0
Eastern Water Company	Inv.		700	1.2	200	200	Gravel packed wells (2)	0.1	51	80	95	5	-	68	73	-	10	25-92	2	2.7
Fair Acres Mobile Park	Inv.		250	0.4	80	-	Drilled wells (2)	0.02	15	-	100	-	-	60	60	-	2	25-45	1	0.3
Fire District of Pawcatuck	Mun.		4,520	7.5	1,684	1,684	Town of Westerly, R.I.	N.A.	475	570	54	28	18	55	101	1,000	-	30-110	2, 7	22.1
Lantern Hill Development Water Supply	Inv.		60	0.1	17	-	Gravel packed well (1)	0.01	4	-	100	-	-	66	66	-	5	20-70	1	0.4
Lord's Point Association	Inv.		500	0.8	158	-	Drilled wells (2)	N.K.	25	-	100	-	-	50	50	-	14	40-60	1	1.5
Mystic Valley Water Company	Inv.		11,500	19.0	2,912	2,730	Two reservoirs Gravel packed well	2.0	1,020	1,820	47	30	23	42	89	2,810	-	30-70	2, 3, 4, 5, 6, 7, 8	56.0
Public Utilities	Total		47,180	78.2	9,103	8,261		14.3	11,007	-	-	-	-	61	234	7,150	49	-	-	167.2
Residential Wells	Total		13,120	21.8	3,900	-	Miscellaneous wells (3,900)	N.K.	234	-	100	-	-	60	60	-	-	-	-	-

INVENTORY OF WATER SUPPLY SYSTEMS

MUNICIPALITY		POPULATION AND CUSTOMER DATA					SOURCE OF SUPPLY		1968 PRODUCTION							WATER WORKS DATA				
Water Service	Ownership	1960 Census	1968 Estimate	% Served	Services	Meters	Description	Est. yield (mgd)	Avg. Day (1,000 gal)	Max. Day (1,000 gal)	Residential (percent)	Ind. & Comm'l (percent)	Other (percent)	Avg. Res Cons. (gpd/cap)	Total Prod. (gpd/cap)	Distrib. Reservoir (1,000 gallons)	Ground Storage (1,000 gallons)	Pressure range (psi)	Treatment code	Length of Pipes (miles)
LEDYARD	Total	5,395	10,400	100.0	2,721	66			688											
Avery Hill Association - Mobile Court	Hom.		125	1.2	43	-	Drilled shallow well	0.12	8	-	100	-	-	66	66	-	1	20-60	2, 3	0.8
Barrett Water Company	Inv.		240	2.3	60	60	Drilled wells (2)	0.03	10	15	100	-	-	40	40	-	13	25-55	1	1.8
Charles Pfizer and Company, Inc.	Inv.		35	0.3	11	-	Gravel packed well	0.25	55	-	48	52	-	75	157	-	6	50-80	6	2.0
Colonel Ledyard Mobile Home Park	Inv.		30	0.3	18	-	Dug well	0.003	3	-	100	-	-	60	60	-	0.5	30-55	1	0.3
Dow Chemical Company	Ind.		-	N.A.	1	-	Pond, wells and infiltration gallery	N.K.	6	-	-	100	-	-	-	100	-	50-60	2, 3, 6	N.K.
Ferry View Heights Water Company	Inv.		270	2.6	64	1	Gravel packed wells (2)	0.04	19	27	100	-	-	70	70	-	19	35-45	1	1.3
Grandview Mobile Home Park	Inv.		70	0.7	25	-	Drilled wells (2)	0.005	5	-	100	-	-	60	60	-	1.5	30-40	1	0.3
Ledyard Center School	Govt.		-	N.A.	3	-	Drilled well	0.01	8	-	-	30	70	-	-	-	2	30-40	1	-
Ledyard Village Homeowner's Association	Hom.		185	1.7	46	-	Gravel packed well	0.01	8	-	100	-	-	43	43	-	5	30-66	1	0.5
Lifetime Homes Water and Sewer Company	Inv.		2,500	24.1	443	4	Gravel packed well	0.15	153	210	98	-	2	61	61	300	-	45-60	2	6.5
Tower Water Company	Inv.		1,230	11.8	317	1	Driven wells (3)	0.90	67	107	100	-	-	55	55	-	40	20-55	1	7.4
Vality Department Store	Inv.		-	N.A.	10	-	Drilled wells (2)	0.03	3	-	-	100	-	-	-	-	2	30-40	1	-
Public Utilities and and Other	Total		4,685	45.0	1,041	66		1.25	345	-	-	-	-	64	74	400	90	-	-	20.9
Residential Wells	Total		5,715	55.0	1,680	-	Miscellaneous wells (1,680)	N.K.	343	-	100	-	-	60	60	-	-	-	-	-
LISBON	Total	2,019	2,800	100.0	860	-			170	-										
Graham Terrace	Inv.		90	3.2	33	-	Drilled well	0.01	5	-	100	-	-	60	60	-	0.5	25-40	1	0.3
Hillandale Water Company	Inv.		35	1.2	10	-	Drilled well	0.04	3	-	100	-	-	50	50	-	0.008	20-40	1	0.3
Home Water Supply Company	Inv.		35	1.2	10	-	Dug well	0.004	2	-	100	-	-	60	60	-	1.0	35-50	1	0.2
Lisbon Mobile Park	Inv.		130	4.6	61	-	Drilled well	0.01	7	-	100	-	-	50	50	-	1.0	35-50	1	0.3
Tunnel Hill Mobile Park	Inv.		65	2.3	26	-	Drilled well	0.08	3	-	100	-	-	50	50	-	0.3	25-40	1	0.2
Public Utilities	Total		355	12.5	140	-		0.12	20	-	-	-	-	57	57	-	2.8	-	-	1.3
Residential Wells	Total		2,445	87.5	720	-	Miscellaneous wells (720)	N.K.	150	-	100	-	-	60	60	-	-	-	-	-
MONTVILLE	Total	7,759	14,000	100.0	4,181	589			884	-										
Country Estates, Inc.	Hom.		87	0.6	19	19	Drilled well (1)	0.19	7	-	100	-	-	75	75	-	35.0	50-70	1	0.2
Deer Run Supply	Hom.		50	0.4	15	1	New London Public Supply		4	-	100	-	-	75	75	-	0.5		2	0.2
G & J Water Company	Inv.		800	5.7	235	188	Drilled wells (2)	0.17	41	68	100	-	-	52	52	-	75.0	20-90	1	3.5
Kitemaug Orchard Association	Hom.		400	2.9	118	0	Drilled wells (3)	0.07	22	-	100	-	-	56	56	-	15.0	50-60	1	2.0
Montville Water Works	Inv.		1,480	10.6	446	381	Drilled wells (6)	0.3	80	132	100	-	-	53	53	-	65.0	60-80	1	4.9
Oakdale, Inc.	Hom.		720	5.2	214	0	Drilled wells (3)	0.12	53	-	100	-	-	74	74	-	70.0	35-80	1	2.4
Industrial and Institutional Consumption	Misc.		-	-	14	-	Wells and Oxoboxo and Thames Rivers		47	-	-	100	-	-	-	-	14.0	-	-	-
Public Utilities and Other	Total		3,537	25.4	1,061	589			254	-	-	-	-	58	58	-	274.5	-	-	13.2
Residential Wells	Total		10,463	74.6	3,120	-	Miscellaneous wells (3,120)	N.K.	630	-	100	-	-	60	60	-	-	-	-	-
NEW LONDON AND WATERFORD																				
NEW LONDON	Total	34,182	32,000	100.0	6,737	6,737			4,340											
City of New London Public Water System - New London Service Area	Mun.		32,000	100.0	6,737	6,737	Four reservoirs	6.45	4,340	5,560	45	26	29	59	132	9,550	1,481	20-100	2, 3, 5, 7	102.1
WATERFORD	Total	15,391	17,700	100.0	5,018	681	Wells and New London System		1,134											
Bargnesi Water Supply Company	Inv.		260	1.5	77	0	Dug wells (2) Drilled well (1)	0.03	23	-	100	-	-	74	74	-	2.5	18-55	2	1.5
Best View Water Company	Inv.		220	1.2	55	0	Dug well (1)	0.03	13	-	100	-	-	59	59	-	1.8	45-65	1	1.2
City of New London Public Water System - Waterford Service Area	Mun.		2,910	16.4	681	681	New London Public Supply		260	330	66	14	20	59	89	-	44.3	18-80	2, 3, 5, 7	10.0+
Millstone Point	Inv.		240	1.4	70	0	Dug wells (2)	0.07	16	-	100	-	-	60	60	-	5.0	35	1	0.6
Ridgewood Park	Inv.		470	2.7	135	0	New London Public Supply		8	-	100	-	-	60	60	-	-	50-70	2	2.4
Waterford Village	Inv.		135	0.7	40	0	Drilled wells (3)	0.08	6	-	100	-	-	60	60	-	35.0	60-80	1	3.0
Public Utilities and Other	Total		4,235	23.9	1,058	681		0.21	328	-	-	-	-	56	76	-	88.6	-	-	18.7
Residential Wells	Total		13,465	76.1	3,960	-	Miscellaneous Wells (3,960)	N.K.	808	-	100	-	-	60	60	-	-	-	-	-

INVENTORY OF WATER SUPPLY SYSTEMS

MUNICIPALITY		POPULATION AND CUSTOMER DATA					SOURCE OF SUPPLY		1968 PRODUCTION							WATER WORKS DATA				
Water Service	Ownership	1960 Census	1968 Estimate	% Served	Services	Meters	Description	Est. yield (mgd)	Avg. Day (1,000 gal)	Max. Day (1,000 gal)	Residential (percent)	Ind. & Comm'l (percent)	Other (percent)	Avg. Res. Cons. (gpd/cap)	Total Prod. (gpd/cap)	Distrib. Reservoir (1,000 gallons)	Ground Storage (1,000 gallons)	Pressure range (psi)	Treatment code	Length of Pipes (miles)
NORTH STONINGTON	Total	1,982	3,400	100.0	972	141			199	-										
Cedar Ridge Water Association	Inv.		437	12.8	124	0	Gravel packed well	0.25	28	-	100	-	-	62	62	-	3.5	44-58	1	1.3
North Stonington Water Company	Inv.		600	17.7	153	141	Gravel packed well	0.36	30	48	100	-	-	50	50	-	10.0	40-50	1	3.60
Mobile Home Gardens	Inv.		80	2.4	25	0	Drilled and dug wells	0.03	5	-	100	-	-	62	62	-	0.7	25-40	1	0.30
Public Utilities	Total		1,117	32.9	302	141		0.64	63	-	-	-	-	56	56	-	14.2	-	-	5.2
Residential Wells	Total		2,283	67.1	670	-	Miscellaneous wells (670)	N.K.	136	210	100	-	-	60	60	-	-	-	-	-
NORWICH	Total	38,506	42,000	100.0	9,206	8,059			5,140	-										
Arpin Court	Inv.		45	0.1	13	-	Drilled well	0.01	3	-	100	-	-	60	60	-	0.7	40-60	1	0.1
City of Norwich Public Supply	Mun.		38,800	92.5	8,182	8,059	Reservoirs (6)	6.65	4,950	6,580	40	22	38	51	128	-	-	44-106	2, 7	107.0
Countryside Drive	Inv.		70	0.2	21	-	Drilled well	0.02	4	-	100	-	-	60	60	-	0.5	40-60	1	0.3
Flyers Drive	Inv.		230	0.5	68	-	Drilled wells (3)	0.05	14	-	100	-	-	60	60	-	3.6	30-70	2	0.3
Lambert Drive Association	Hom.		180	0.4	54	-	Drilled wells (2)	0.04	11	-	100	-	-	60	60	-	3.0	35-60	1	0.3
Little Valley Mobile Village	Inv.		280	0.6	140	-	Drilled well	0.03	14	-	100	-	-	60	60	-	15.0	30-50	1	0.5
Oakland Heights Mobile Home Park	Inv.		120	0.3	33	-	Drilled well	0.04	7	-	100	-	-	60	60	-	7.0	40-50	1	0.5
Occum Water Company	Inv.		120	0.3	41	-	Drilled wells (4) Gravel packed (1)	0.07	6	-	70	30	-	60	60	-	15.0	30-65	2	0.8
Pleasure Valley Mobile Home Park	Inv.		210	0.5	84	-	Drilled wells (2)	0.07	11	-	100	-	-	60	60	-	5.0	30-50	1	1.0
Public Utilities and Other	Total		40,055	95.4	8,636	8,059		6.98	5,020	-	-	-	-	51	123	-	49.8	-	-	110.8
Residential Wells	Total		1,945	4.6	570	-	Miscellaneous wells (570)	N.K.	120	-	100	-	-	60	60	-	-	-	-	-
PRESTON	Total	2,778	3,000	100.0	878	58			29	-										
Country Squire Development	Inv.		200	6.7	58	58	Drilled well	0.04	12	19	100	-	-	60	60	-	15	42-80	1	1.6
Residential Wells	Total		2,800	93.3	820	-	Miscellaneous wells (820)	N.K.	17	-	100	-	-	60	60	-	-	-	-	-
SALEM	Total	925	1,300	100.0	380	-			78	-										
Residential Wells	Total				380	-	Miscellaneous wells	N.K.	78	-	100									
SPRAGUE	Total	2,509	2,700	100.0	664	-			226	-										
American Sugar Company	Ind.		-	-	-	-	Drilled wells (2)	0.10	3	-	-	100	-	-	N.A.	250	-	40-60		
Angus Park Woolen Company	Inv.		150	5.0	46	-	Reservoir	0.50	60	80	13	80	7	50	400	50	-	15-55	2, 3, 4, 5, 6	0.7
Federal Paper Board	Ind.		-	-	-	-	Drilled wells (3)	0.03	6	-	-	100	-	-	N.A.	150	-	50-60	-	-
Sprague Water and Sewer Authority	Mun.		1,600	60.0	338	-	Reservoir	0.21	100	124	75	20	5	47	63	-	-	10-100	2	3.6
Public Utilities and Other	Total		1,750	65.0	384	-		0.84	169	-	-	-	-	48	92	-	1,000	-	-	4.3
Residential Wells	Total		950	35.0	280	-	Miscellaneous wells (280)	N.K.	57	-	100	-	-	60	60	-	-	-	-	-
VOLUNTOWN	Total	1,028	1,300	100.0	380	-			78	-										
Residential Wells	Total				380	-	Miscellaneous wells	N.K.	78	-	100									

OWNERSHIP

- Inv. Investor owned
- Hom. Homeowner's Association
- Mun. Municipally owned
- Govt. Government owned
- Ind. Industry owned
- Com. Commercial

ABBREVIATIONS

- N.K. Not known
- N.A. Not applicable
- * Seasonal supplies
- # Institutional consumption

TREATMENT CODE

1. Untreated
2. Chlorination
3. Corrosion control
4. Filtration
5. Softening
6. Iron, manganese removal
7. Fluoridation
8. Taste, odor control

REMARKS

1968 Estimated population is based on information from the State Department of Health.

In cases where population estimates were not available from the utility, 3.4 people per service were assumed.

In cases where the water production is not metered, 60 gal per capita was used as a basis of average day water consumption.

Estimated yield of supply sources was obtained from engineering reports, from the State Health Department, and from information furnished by the owners.

Maximum day consumption was obtained from utility records.

MUN

Water Se

LEDYARD

Avery Hill A
Mobile Cou

Barrett Wate

Charles Pri
Company, I

Colonel Ledy
Home Park

Dow Chemica

Ferry View
Company

Grandview M
Park

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MONTVILLE

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Montville

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NEW LONDON

NEW LONDON

City of N
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WATERFORD

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Millstone

Ridgewood

Waterford

Public
Other

Resider